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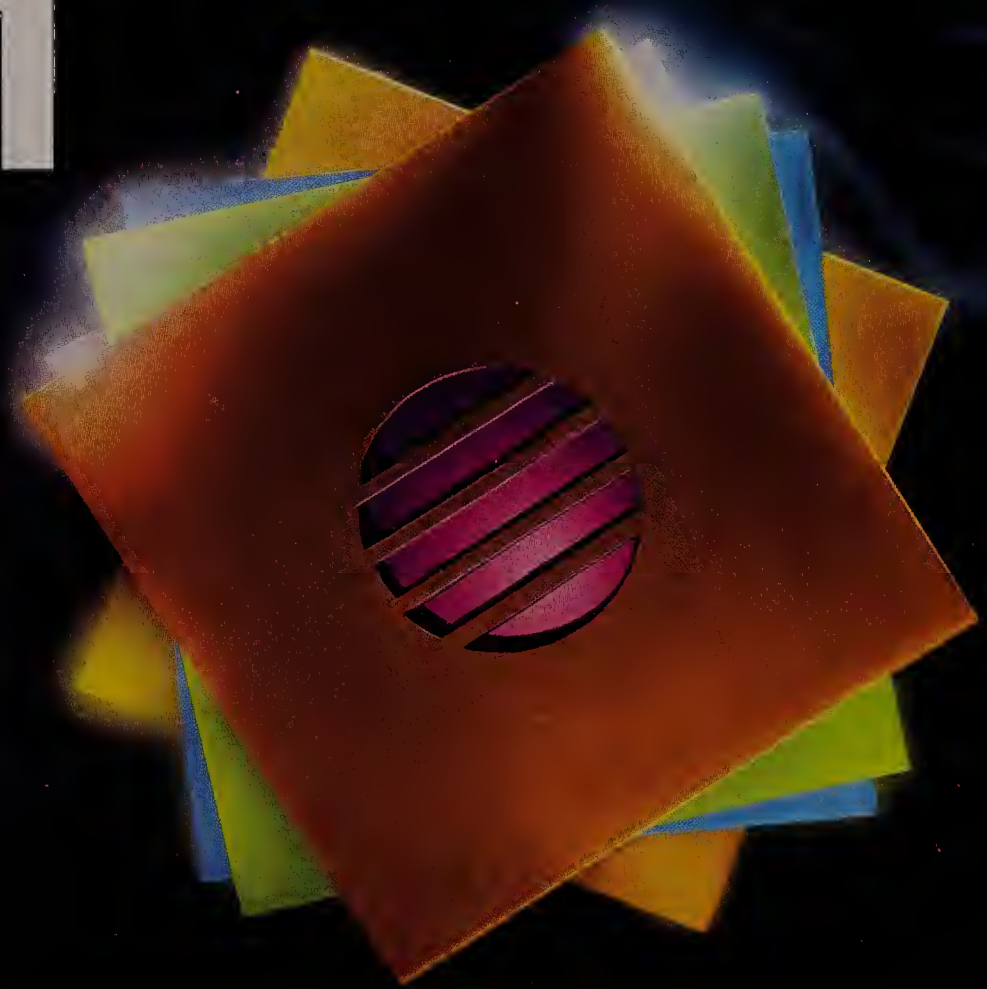

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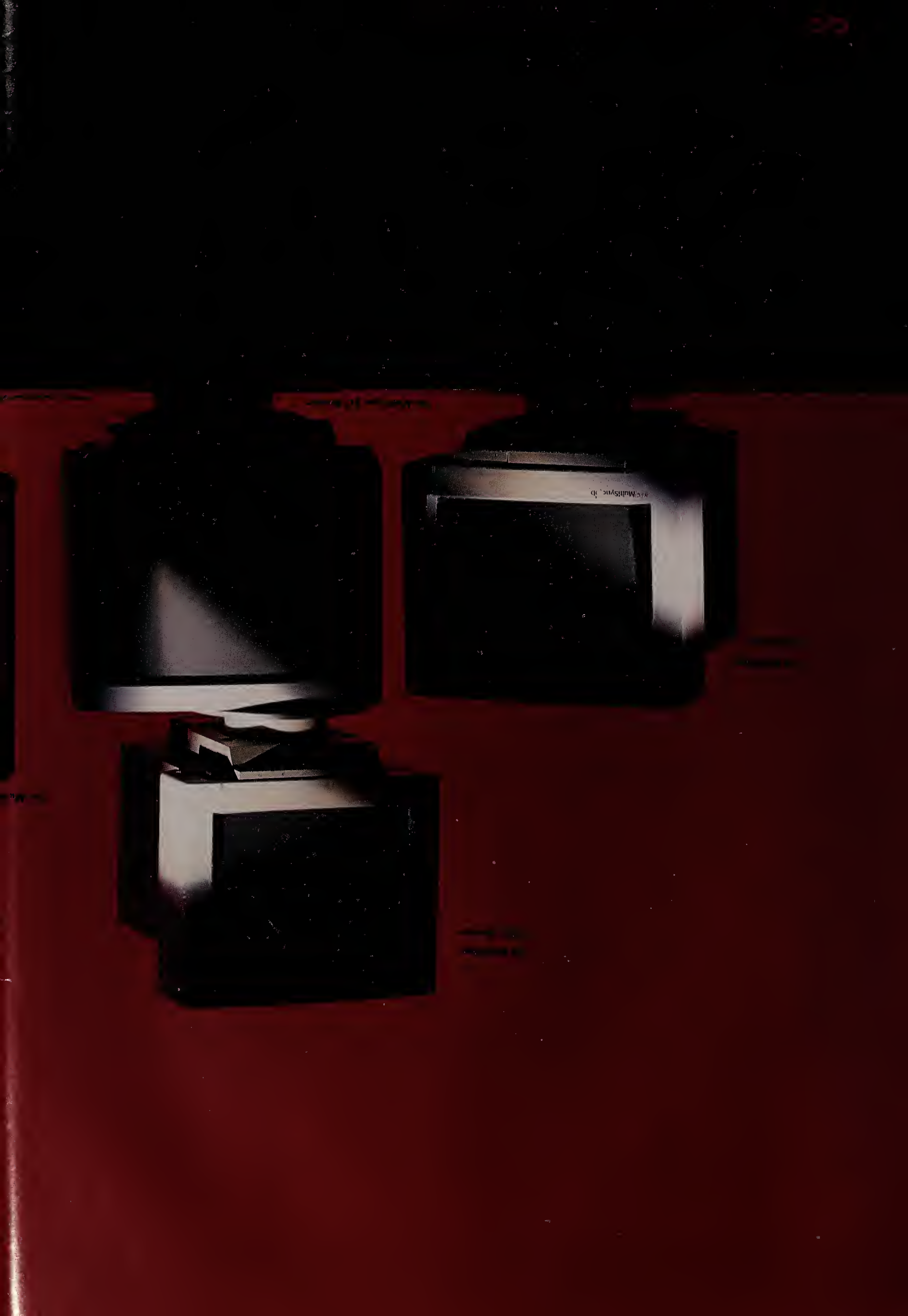

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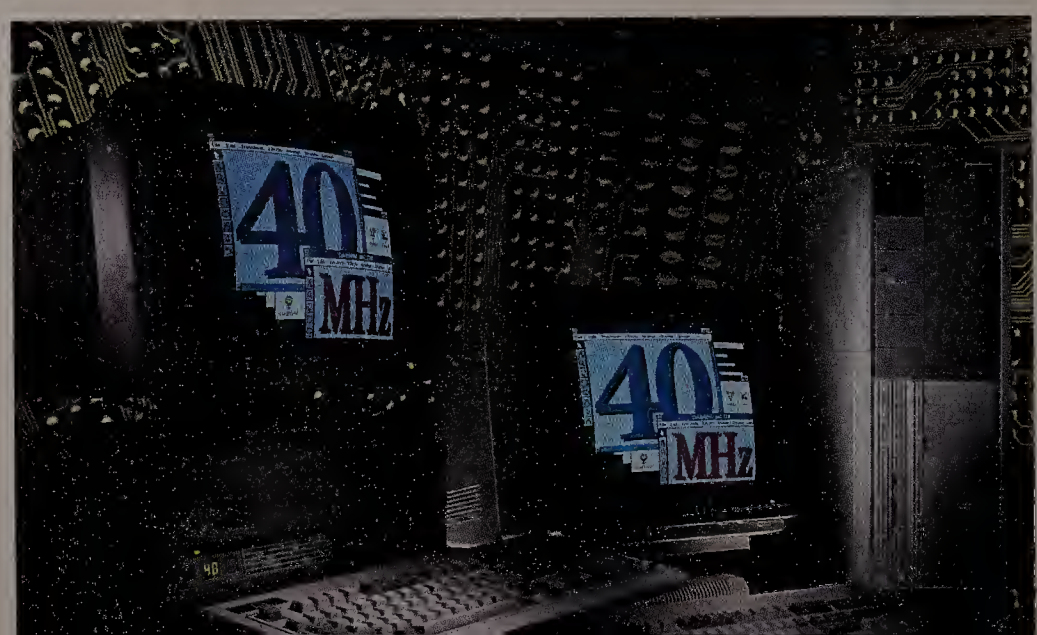

40-MHz 386 Systems
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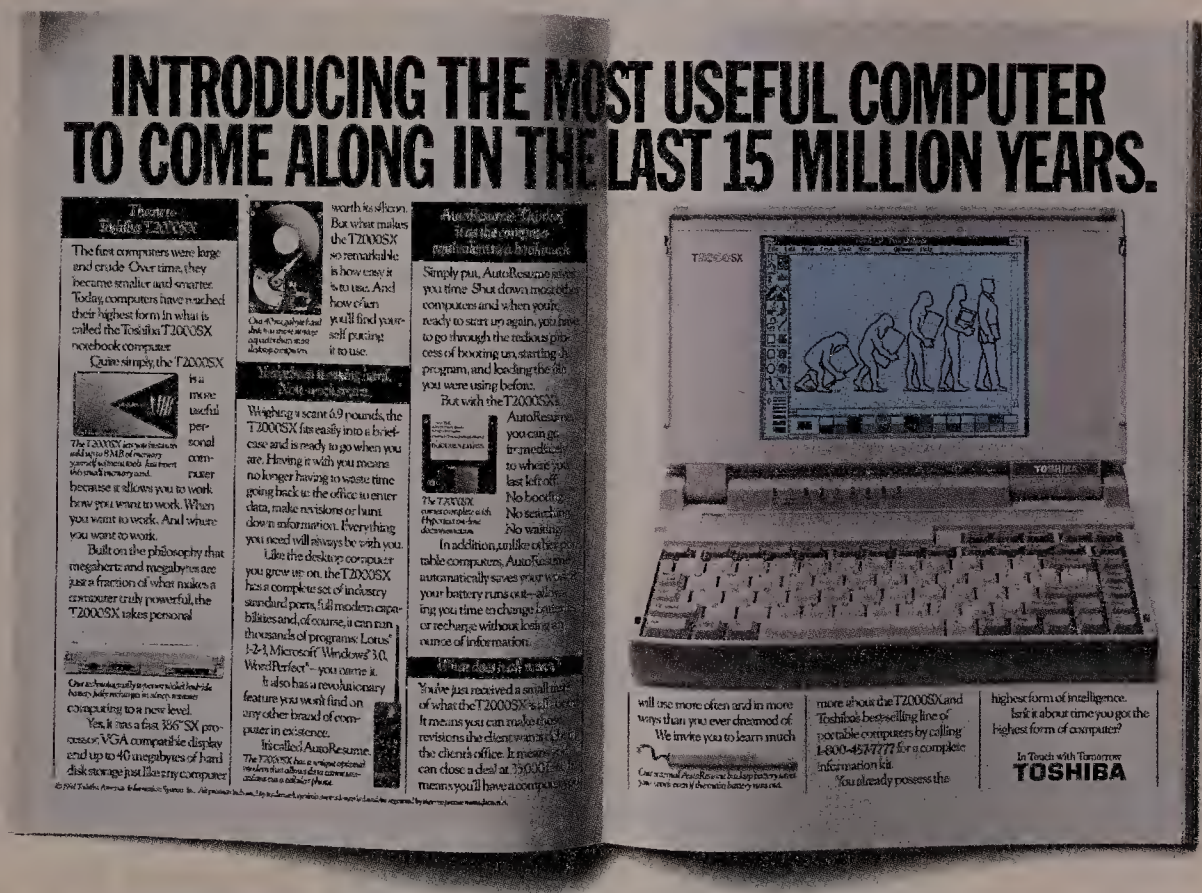

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PC World Editorial, 501 Second St. #600, San Francisco, CA 94107
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PC World™ (ISSN 0737-8939) is published monthly at $29.90 for one year (12 issues), $59.80 for two years (24 issues), $89.70 for three years (36 issues) by PC World Communications, Inc., 501 Second St. #600, San Francisco, CA 94107. Foreign orders must be prepaid in U.S. funds with additional postage. Add $18 per year for Canada and Mexico; add $46 per year for airmail for all other countries. Canadian GST Registration #R124669680. Second-class postage paid at San Francisco and additional mailing offices. POSTMASTER: Send address changes to *PC World,* Subscription Dept., P.O. Box 55029, Boulder, CO 80322-5029. Editorial and business offices: 501 Second St. #600, San Francisco, CA 94107, 415/243-0500; CompuServe 74055,412; MCI Mail PC World Editorial. *PC World*™ is an independent journal, not affiliated in any way with International Business Machines Corporation. IBM is a registered trademark of International Business Machines Corp.

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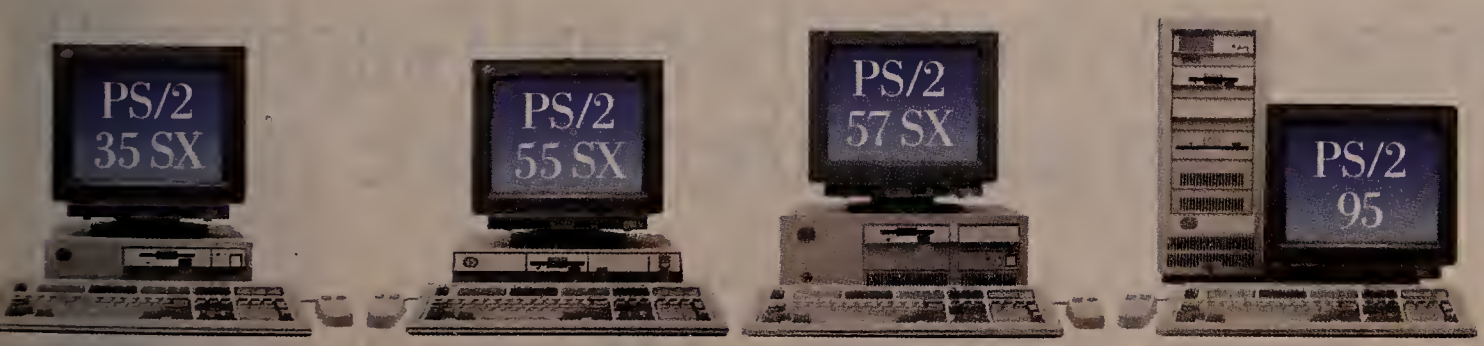

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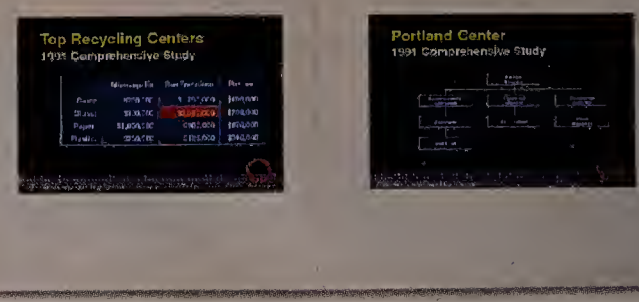

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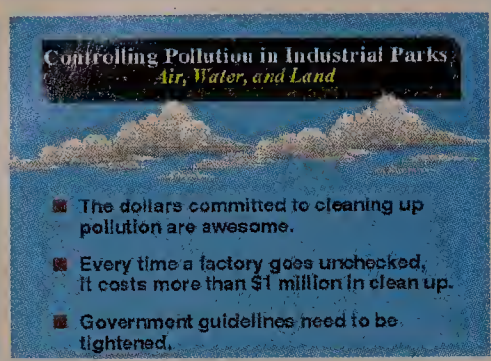

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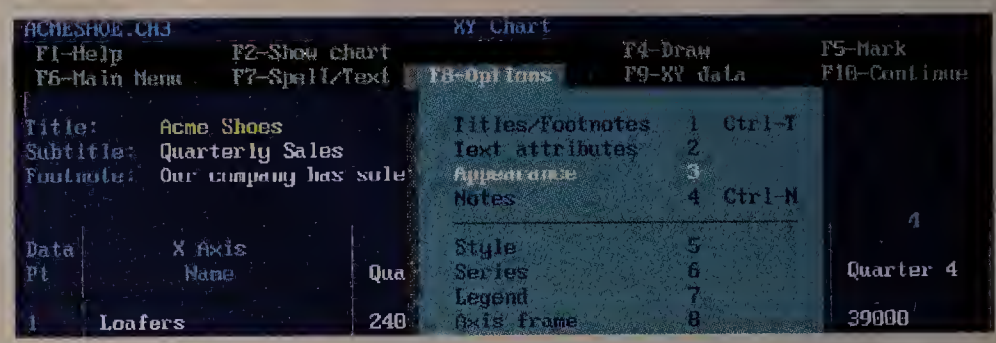

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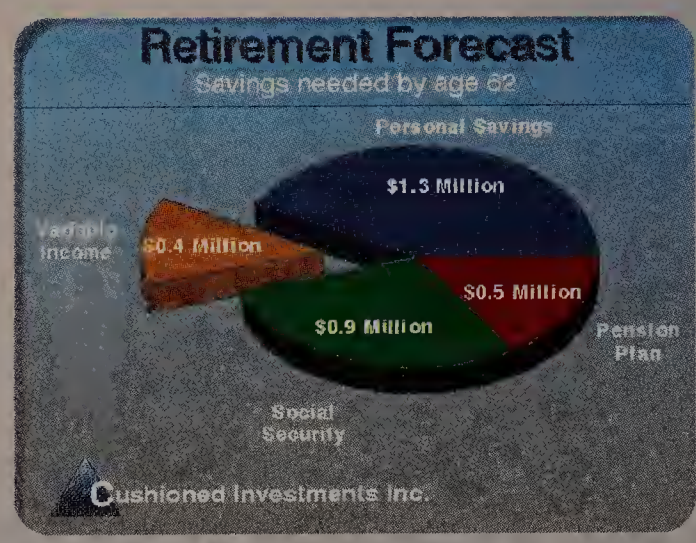

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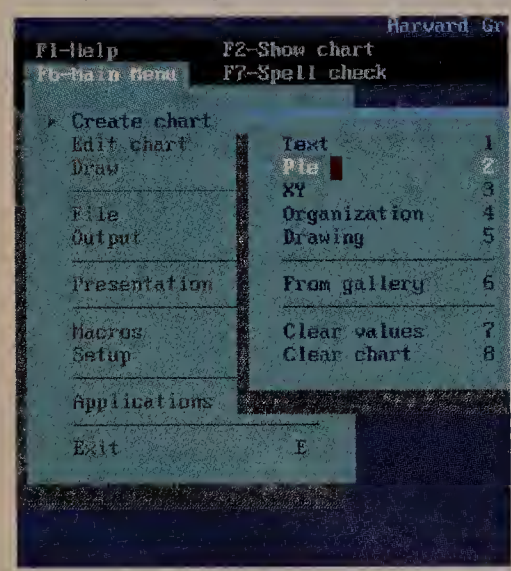

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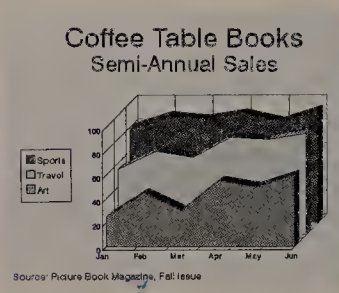

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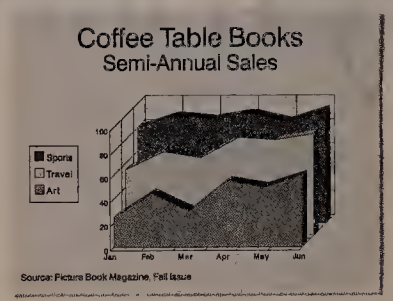

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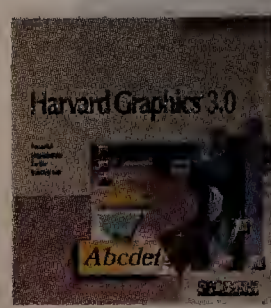

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World Class team: Daniel Tynan, Christine Whyte, and Larry Wilson

ROBERT CARDIN

The Readers' Choice

The *PC World* staff has more than its share of self-styled movie critics. This is never more apparent than in early spring, the morning after the Oscars, when *PC World*'s offices are awash in groans and second guesses. If only we'd had the chance to vote!

We may not have the opportunity to cast our ballots for the stars, but *you* do, thanks to the World Class Awards, where *PC World* readers—not judges or editors—pick the best products of the year. Every spring thousands of you vote for an array of stellar hardware and software products—this year in 49 categories. In this issue, and for the ninth consecutive year, we display the newly minted World Class Awards and present them to the entrants you've endorsed.

Christine Whyte, author of this year's World Class Awards feature, has been with *PC World* from the beginning—for four years as a staff editor, and as a star contributor ever since. You can thank Whyte and other founding editors for dreaming up the World Class Awards and recognizing the value of your opinion.

How valuable? Those who send in their ballots by April 15th each year have a shot at becoming one of three prizewinners—the first prize consists of nothing less than the award-winning hardware and software in all categories. In 1983 the first-prize winner received over $14,000 worth of merchandise, including an IBM PC with a whopping 64K of RAM. This year a Compaq Deskpro 486/33L with 4MB leads a fleet of winning products worth more than $35,000.

Whyte had the pleasure of calling and congratulating this year's first-prize winner. In a display of healthy skepticism, Anthony D'Onofrio of North Scituate, Massachusetts, called her back four times to make sure the prize was on the way.

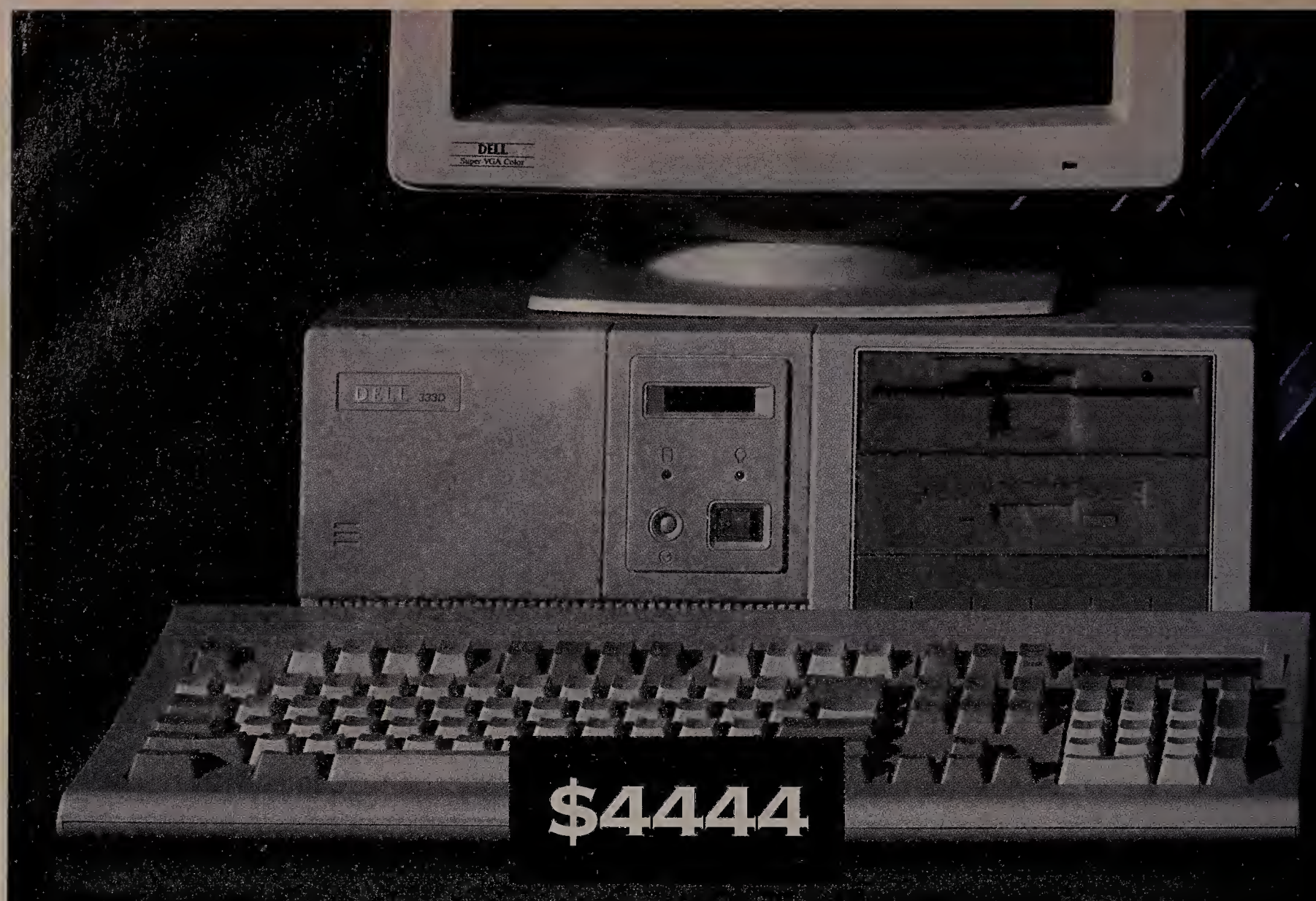
At the request of Associate Editor Daniel Tynan, her editor on the project, Whyte hit the phones on another mission. Tynan (who devised the Oscar theme for this year's article and is responsible for all the horrible Hollywood puns therein) instructed Whyte to call 30 respondents who'd voted for three of this year's most dramatic winners—*Quattro Pro, Paradox,* and *Windows*—to find out why those votes were cast.

Larry Wilson, whose Wilson Research Group tallied the votes, provided Whyte with the names. Both Whyte and Tynan expected a wide range of responses. Surprisingly, after Whyte had contacted some 20 voters, the answers, she says, "began sounding like a broken record. The number one reason for voting for any of the three products was simple: ease of use." Food for thought, software developers.

World Class is hardly *PC World*'s only reader forum. Check out this month's *Rate Your Satisfaction* survey, in which your fellow readers tell what they think of the top four spreadsheets. Turn to the *Road Test* that follows, and enjoy frank evaluations of these spreadsheets from veteran users. Finally, our Buyers' Guide to hardware service and support—which surveys 33 top system vendors—reveals the problems readers have with their PCs, and how they feel about vendor repairs.

You may not have the ear of the company that makes your favorite spreadsheet or PC. But when you let *PC World* know your views, you can be sure the industry is listening.

Eric Knorr
Editor



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LANtastic shatters the myth that networks have to be an employment program for on-site computer technicians.

Out in Indiana farm country in 1988, Dennis Reese indulged his passion for computers by adding a room to his dad's farm equipment company. Last July, he started connecting his customers on LANtastic networks. Today that sideline is turning a million dollars a year.

His biggest client was running a 25-node network on one Novell system and preparing to upgrade to another. That's when Dennis installed Artisoft's LANtastic. "I told them if they didn't like it, I'd pull it out. No charge. Now they're the happiest customer I have. They really like having multiple servers with drives formatted for DOS. They thanked me for giving them back their computers."

LANtastic is so easy to use that Dennis's customers *enjoy* networking. The flexible peer-to-peer structure was another plus. "We have had many applications that bogged down on a client-server network. Now with LANtastic we can redistribute the processing to multiple servers."

Dennis' clientele are people more interested in being experts in their own fields rather than having to become—or hire—experts in an overcomplicated network. They are doctors, lawyers and industrial specialists like a large communications tower producer, a bearing manufacturer and a plastics firm that makes showers and tubs.

There's a myth that networks have to be an employment program for on-site computer technicians. Artisoft's LANtastic shatters the myth with a network that everyday people can install and understand and use with confidence.

"We will now turn down a network job if we are forced to install Novell. We tell people that our network is really called *FANtastic* and that Artisoft just can't spell."

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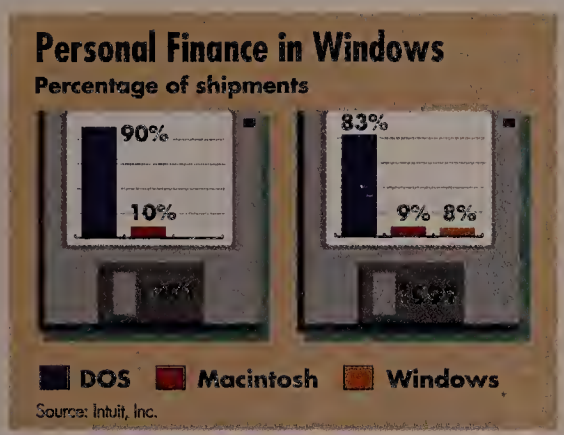
Check Writers Go Graphic

Microsoft Challenges Intuit's Quicken

Personal finance plans to go *Windows* by October, when Microsoft ships *Money* and Intuit will ship *Quicken for Windows*. So what can a memory-hog graphical user interface bring to a category already typified by intuitive menus, low memory requirements, and rock-bottom prices?



DOS shipments should continue to dominate personal finance software in the near term.

Not much, says Intuit director of marketing John Monson; ease of use is already *Quicken*'s calling card. But he promises that *Quicken for Windows* will have the same intuitiveness as the DOS-based product. Intuit's check writer/one-write accountant dominates a category that, together with tax software, ships around 1.8 million copies annually. This makes them second only to word processing in popularity.

A low price point also helps. List on both *Quicken for Windows* and the new DOS-based *Quicken 5* is $59.95, which translates to about $40 on the street. But the price is only one expense, which is why Monson expects the *Windows* version to garner only 8 percent of users, while 83 percent will go for *Quicken 5*. "Small businesses and individuals aren't ready for *Windows* because their machines aren't optimized for it," he explains. "Even those with 386s don't have enough memory and storage." A survey of home and small-business PC users by Genesis Research Associates of San Jose, California, revealed that only 10 percent have *Windows 3.0*.

Microsoft product manager Mike Houston counters that more *Windows*-capable computers are shipping daily and predicts that *Windows*-based finance managers will account for 40 percent of 1992 sales. At $69.95, *Money* will offer innovation where customers spend 95 percent of their time: in data entry and report creation, says Houston.

Bargain Quattro, Paradox Debut

Never afraid to undercut competitors, Borland may be starting a price war by offering versions of *Quattro Pro 3.0* and *Paradox* for $69.95 and $99.95, respectively. Aimed at small-business and home users, *Quattro Pro SE* and *Paradox SE* keep most of the functionality of their fast-selling cousins (which list for $495 and $695, respectively).

The new low-end spreadsheet is similar to *Quattro Pro 2.0*. The *SE* data base omits several important features, including the ability to create applications without programming. Borland offers a competitive upgrade from *dBASE* to the full *Paradox* for $175.

Currently, *Quattro Pro*'s market share seesaws with that of *Excel*, depending on who has the latest pricing special. On the data base side, *Paradox SE* follows in the footsteps of Microrim's *Personal R:base* and Alpha Software's *Alpha Four*, which is selling in high volumes at $100 for the first copy.

The *SE* products are tailored for superstores and other low-margin outlets, says Seymour Merrin of Merrin Information Services. "Customers are no longer willing to pay the old price points. We in this industry have done a wonderful job convincing them of two things: products really are easy to use, and whatever you're paying, it's too much," he says.

Because of the current flood of cheap competitive upgrades, it's hard to draw definitive conclusions about price trends for mainline business applications, other analysts say. *Windows* packages are arriving with the price tags of their DOS predecessors, and prices are firm on leading packages, notes John Murphy of Metro Computing. "Volume buyers are now encamped on *WordPerfect* and *1-2-3* and *dBASE*."

Network-Ready DOS Due From Merger

The approaching nuptials of network operating system powerhouse Novell and client operating system maker Digital Research will yield a network-ready client operating system that is better than Microsoft's MS-DOS, promises Novell executive vice president Darrell Miller. The pair plans to deliver in 1992 a single-menu installation scheme across DR DOS, graphical environments, and NetWare, as well as more consistent directory and network management services at all levels.

The single-user desktop is no longer the default environment, as "we have all been conditioned to believe," says Miller. Instead, large corporations and small businesses are saying they want their percentage of networked PCs to increase to 100 over the next two years.

Could be, but with single-user OS sales at 95 percent, compared with something less than 5 percent for DR DOS, MS-DOS's hegemony is hardly threatened, says InfoCorp vice president Bill Higgs. "Most of the things you would do to extend DR DOS are in conflict with *Windows*," warns Microsoft senior vice president Steve Ballmer, who adds that *Windows*, not DOS, code will control most future network station tasks.

Similarly, no network package, including Microsoft's slow-selling *LAN Manager*, is in a position to sidetrack the NetWare juggernaut, says Jamie Lewis, editor in chief of the *Clarke-Burton Report*.

Microsoft and Novell agree that client and server system software markets are coming together, and both are working to extend "hooks" into the other's operating environment to create seamless integration and compatibility, says Higgs. But to the extent that both giants try to control the other's base code, it will interfere with the cooperation needed to bring new functionality to network users, Lewis warns.

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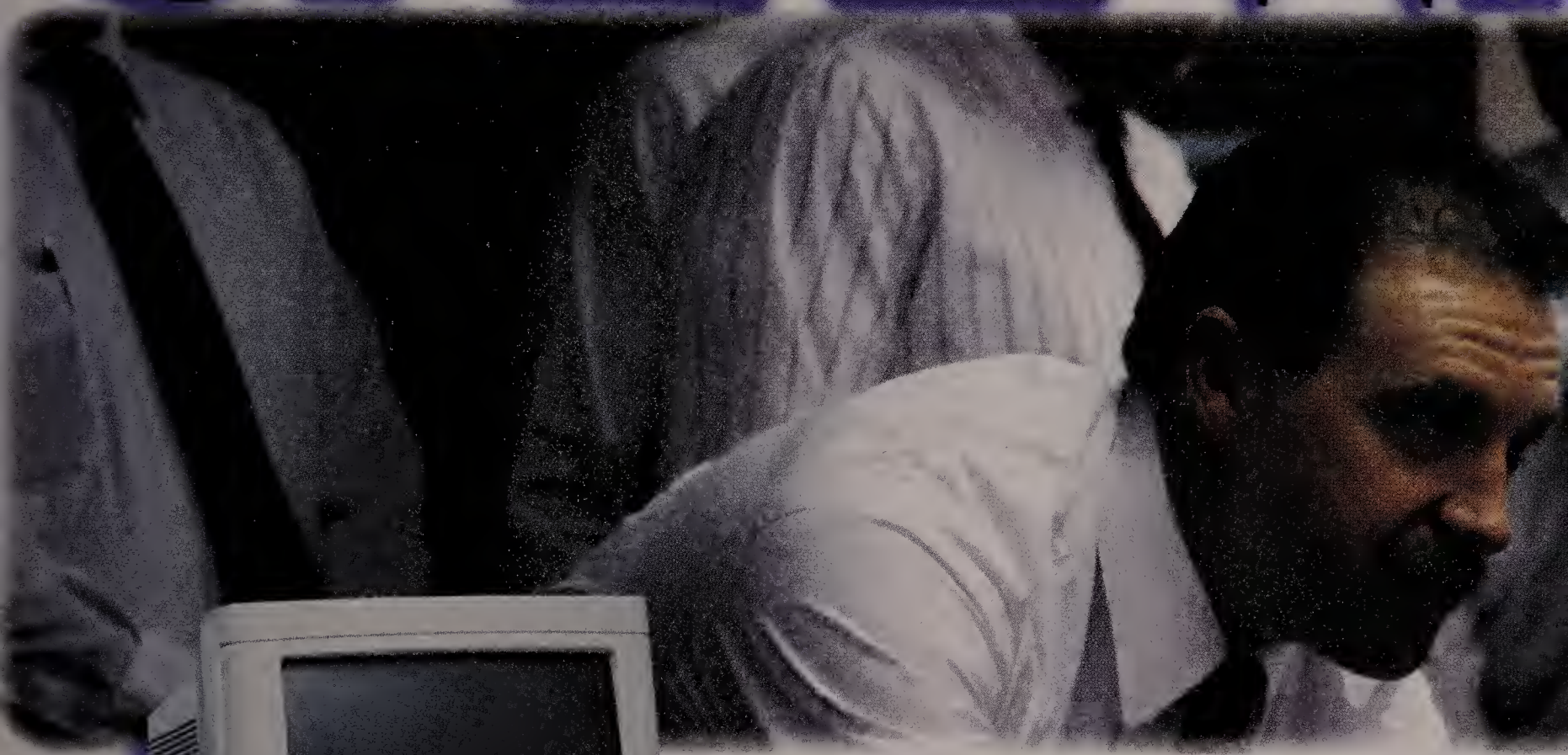

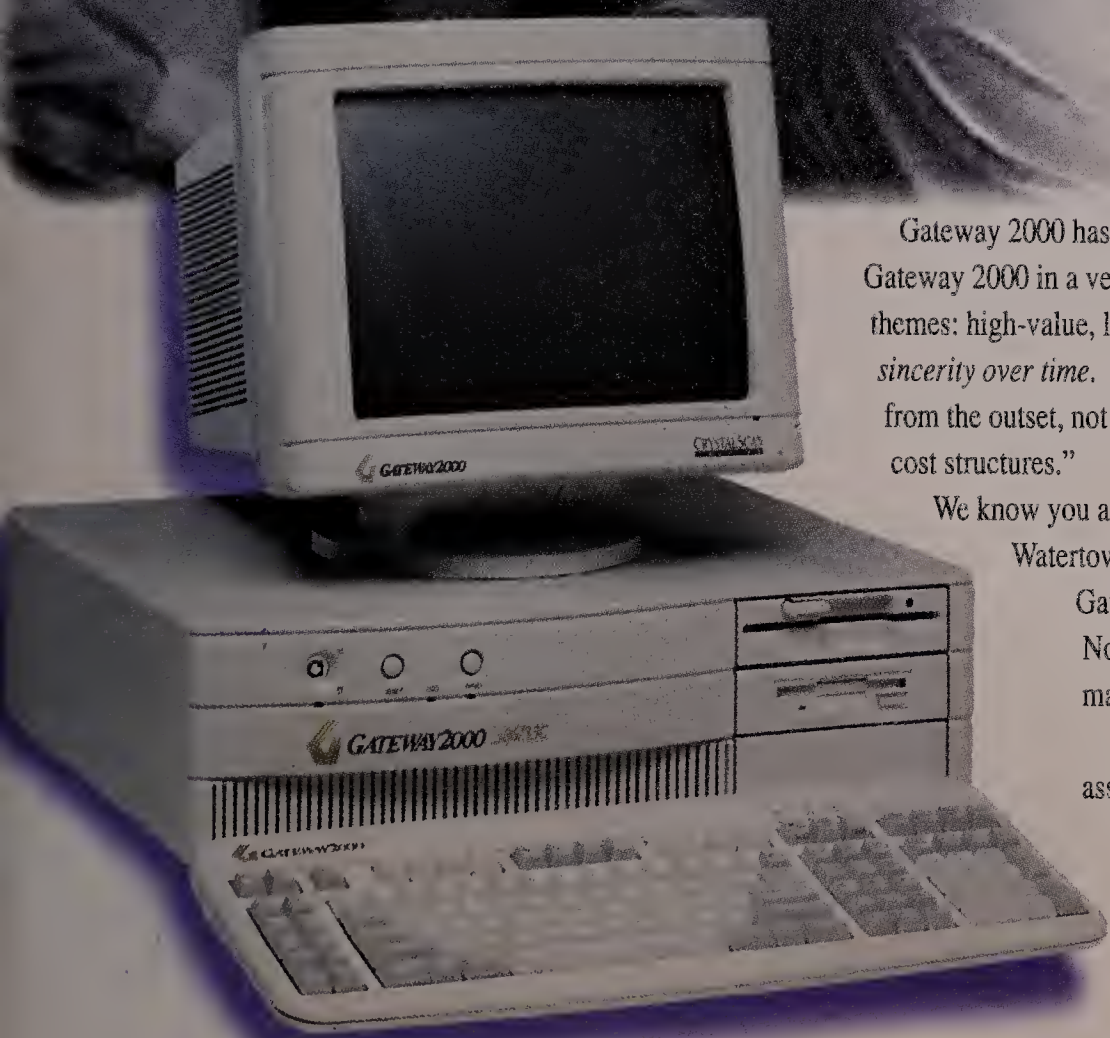

Gateway 2000 has stood the test of time. *PC Week's* Sam Whitmore includes Gateway 2000 in a very short list of successful computer makers. "The common themes: high-value, low-cost products. Close contact with customers. *And sincerity over time.* Buyers value vendors that have priced their products fairly from the outset, not just in reaction to dwindling market share and impractical cost structures."

We know you also value a vendor's stability over time. A dentist from Watertown, South Dakota, wrote to us recently for assurance that his Gateway computer won't become an "orphan" someday. Nobody wants to buy a PC today and find out tomorrow the manufacturer went out of business.

When you buy a Gateway 2000 computer, you can be assured that you're doing business with one of the largest and most successful PC direct marketers in the nation. In the July 1 issue of *Business Week* magazine, Gateway is ranked as the third largest direct market computer manufacturer in the nation based on 1990 revenues of $275 million. In just two quarters of 1991, we've nearly exceeded 1990 revenues. Many

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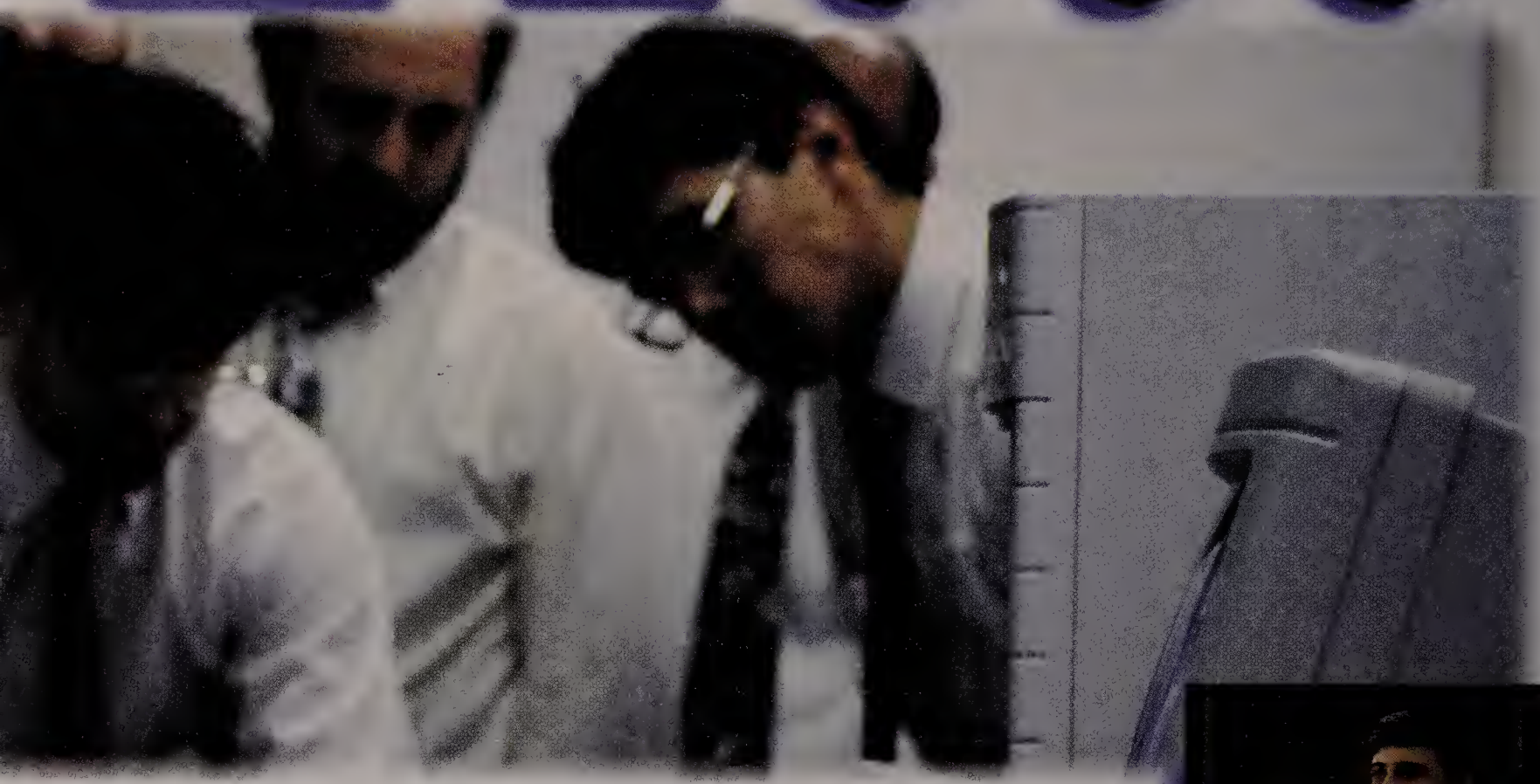

companies would envy our June 30 balance sheet, which shows current assets outweighing current liabilities by more than 2 to 1 and our equity being more than 10 times our long-term debt.

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Andy Rifkin
Time Customer Service

Gateway 2000 has stood the rigorous tests of Time Customer Service in Tampa, Florida. TCS now has over 250 Gateway systems in use. Some of the Gateways are used in mission critical business applications such as Target Select. Target Select is a process whereby a magazine is built and customized with inkjet printing at bindery time. But TCS's Andy Rifkin, Director of Advanced Technologies, didn't buy all those Gateways without careful consideration.

"We use Gateways in mission-critical applications," said Andy. "If the systems running our application go down, we're out of business. That's why we do extensive testing before we buy. We have at least one PC from every computer company ever in existence," he continued. "These systems have all been through our testing process, but the Gateways have unquestionably been our top-performing PC's with a failure rate less than 2%."

Andy said initially it was risky for him to recommend Gateway 2000 over the more traditional corporate computer suppliers. "But Gateway came through for Time Customer Service, at a fraction of what we had been paying for PC's."

Dealers Merge, Superstores Boom

Today's PC-savvy customer is shaking the very foundation of computer resellers all across the nation, triggering mergers among the largest chains and fueling the rapid growth of computer superstores and other low-margin consumer-style outlets.

Traditional resellers will lose a share of the PC sales dollar to mass merchants and superstores.

User needs are increasingly polarized between high service and virtually none at all, notes International Data Corporation analyst Lee Levitt. The giant chains created by this year's megamergers—ComputerLand/Nynex, Inacomp/Valcom, JWP/Businessland—target the first set of customers, by offering a national presence and vast resources invested for technical strength.

But the fastest growth is at the other end of the spectrum: computer superstores, consumer electronics outlets, discount department stores, and office product outlets. Their sales should jump from $6.6 billion (or about 16 percent of PC sales) this year to $20.7 billion (or 38 percent) by 1993.

Leading dealer Intelligent Electronics plunged into this arena by buying office products chain Bizmart, and dealer/manufacturer Tandy will open six Computer City stores by year-end. Even dealer stalwart Compaq plans to sell through Bizmart and other superstores that meet its service standards. "It's become a necessary channel for distribution," says Compaq spokesperson John Sweney. AST, Acer, and other firms are going even further by tailoring PCs to mass merchants such as Circuit City. "People today know enough about the technology to go in and say, 'This is the feature set I want at the price I want,'" explains AST product manager Bret Berg.

"Superstores will be successful, but they're not going to take over the distribution of PCs," cautions InaCom president Bill Fairfield. "That hasn't happened in other industries." Prices are likely to settle in at levels appropriate to the service provided, says Radio Shack planning director Ed Juge. Adds IDC's Levitt, "there will never be more than 100 computer superstores in this country." Most entrants, he feels, will become indistinguishable from office product outlets.

Notebook Improvements Coming

Already fast becoming the tail that wags the PC sales dog, the notebook computer is due for greater improvements in weight, display, power consumption, and expandability by year-end. Notebook makers are working to trim the average 8½ by 11-inch product to about 1½ inches thick and shed about 2 of its 7 pounds.

Everex just announced its 5.2-pound Tempo VX, which trades weight for battery life, while NEC's 4.8-pound UltraLite III ships with an external floppy. But by the year's end, several vendors will show notebooks that make that weight without trade-offs. A harbinger of that class is Toshiba's recently announced T2200SX, whose light nickel-hydride battery and folding circuit board help it squeeze a floppy, 60MB hard drive, 9½-inch diagonal display, and 3 hours of battery life into a 5.5-pound, 1.6-inch package.

Static processors such as AMD's Am386SXL-25 and Am386DXL-40 combined with nickel-hydride batteries and new power-conserving chip sets will spawn various combinations of 25-MHz to 40-MHz notebooks still capable of the standard 3 hours of battery life or more. Notebook makers figure they can push battery life to 5 hours by using 3.3-volt, instead of 5-volt, circuitry. Texas Instruments says its own homegrown silicon lets its new 6-pound TravelMate 3000 WinSX run 4 hours on a single charge.

More than one vendor is working on an improved version of an inexpensive passive-color LCD, one of which could be shown as early as October.

How important has the notebook computer become? One of the top six PC makers said privately that by year-end, notebooks should account for half its total sales.

GORDON STUDER

Dual-Speed Processors Approach

Users shopping for a 486SX system may want to pay special attention to whether it has a 487SX math coprocessor socket. That will be the path to substantial processor flexibility early next year when Intel unveils dual-speed processors in 20/40-MHz, 25/50-MHz, and 33/66-MHz flavors.

When Intel released the 20-MHz 486SX processor in April with a "not-enabled" math coprocessor, it recommended that system clients provide a second socket in their CPU cards for a 487SX math coprocessor and future unspecified upgrades. But because the 487SX coprocessor is actually a 486SX with the math coprocessor enabled (it puts the original 486SX to sleep), about a third of 486SX system makers chose to simply offer single-socket designs that can accept the 487SX.

Now it seems the coprocessor socket, which Intel calls the performance upgrade socket, is designed to house an upgrade chip that doubles the speed of the processor without requiring changes to other components. This is accomplished by having the processor run externally at the same speed for which the system is designed—20-MHz, 25-MHz, or 33-MHz—but at twice the speed internally. Intel will release faster versions of the 20-MHz 486SX before year-end but won't specify their speeds.

Early 486SX proponent Acer America plans to be into dual-speed systems early as well, says director of product marketing Olend King. Acer already offers a similar system, the Power 486SX, with a variable-speed oscillator and additional firmware that let the owner replace its 20-MHz 486SX with a commodity 25-MHz or 33-MHz 486DX without having to buy a proprietary CPU card or expensive memory upgrades.

King adds that Intel's dual-speed strategy would cut some of the electromagnetic frequency problems of higher-speed external processors.

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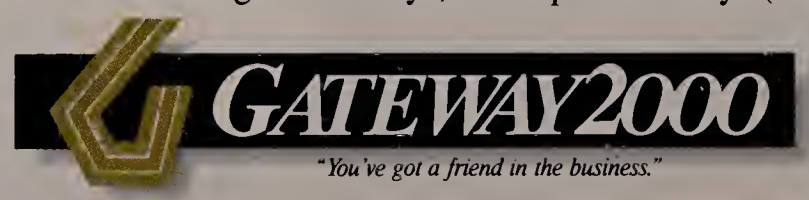

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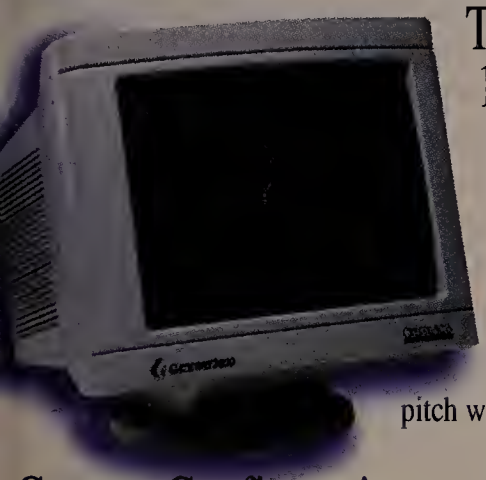

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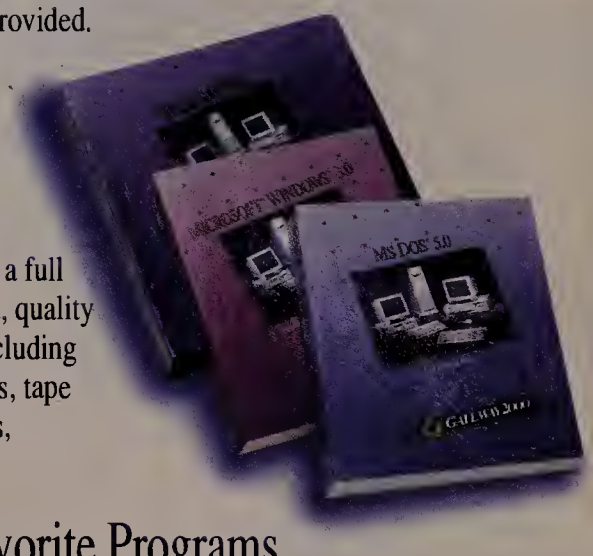

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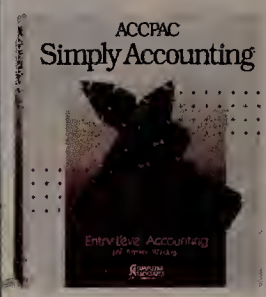

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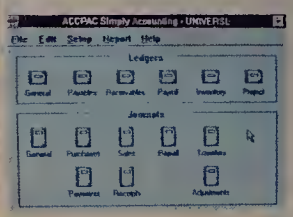

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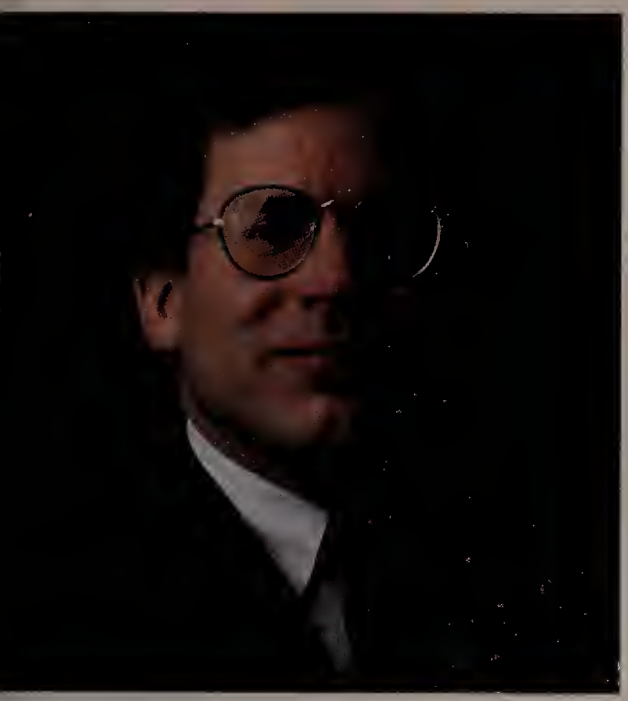

I Was a Mobile Executive

What happens when an editor enters the world of fully wired mobile electronics? He moves on to other things, that's what!

It started innocently enough. When my travel schedule started turning me into the darling of frequent-flyer-club hosts everywhere, the editors back at *PC World* (not usually a sentimental lot) actually began grumbling that they weren't seeing enough of me. "What am I supposed to do," I complained to my sympathetic ad sales manager. "Stay home and keep the editors happy, or stay on the road and keep the sales staff happy?"

"Get a cellular phone," she suggested resourcefully.

Two weeks later, I had bought, charged, and programmed the latest in miniaturized personal communication devices, and the editors were once again their normal impassive selves. I was able to call in from the road whenever I got a free moment; when I was busy, I could forward incoming calls to our company's voice mail system. I was plugged in, as they say. But that was only the beginning.

All Talk, No Data

I still had problems. Editors wanted to talk with me about their work in progress, but most of it resided on a local area network back at headquarters. To stay completely in touch, I needed a portable PC that could hook into the LAN and run the *Windows* software we rely on to do our jobs.

Plus, a lot of the information I needed was on my office PC's hard disk, not on the LAN, and I hadn't figured out a simple way to transfer (or even identify) all the significant new data I'd have to take with me on the road. Moreover, at 100MB, my office PC's hard disk was almost twice as large as my laptop's hard disk, so I couldn't just perform a wholesale file transfer.

That's when I got the fateful call that changed my life. A Compaq representative telephoned with an offer to let me try out an LTE 386s/20, with a docking bay for a network board and other peripherals. I eyed a Bernoulli box, sent to me the previous week, lying still unopened in one corner of my office. In what seemed at the time like a flash of brilliant insight, I quickly accepted the offer. But in fact, I didn't have a clue about what I had just done.

A Wizard in My Pocket

One long weekend later, I had managed to rig up a system that included the Compaq notebook, docking bay, Bernoulli box, network board, and VGA monitor. Using the network file server as a temporary way station, I moved all necessary programs and files from my desktop PC to the notebook's smaller hard disk. Then I loaded less frequently used programs and files onto the Bernoulli box. A few hours of fiddling with batch files and network log-ins resulted in a PC environment that made me feel as much at home on the road as back in the office.

Only one crucial question remained: What happens when I'm not at my cellular phone or notebook PC, but instead at a meeting, where most important business is conducted?

The next weekend I drove a few miles out of town to a PC superstore where I picked up a Sharp Wizard organizer and PC interface package. A few weeks earlier I had switched my appointment and contact info over to *Packrat*, a *Windows* personal information manager that includes an automatic link to the Wizard.

Now I'm a fully powered mobile executive with more business information at my fingertips than I can shake a stick at. My office PC and travel PC are one and the same, except for some network files I can access via modem and some beta software I wouldn't use on the road anyway. I can carry crucial bits of business data into a meeting in an unobtrusive fashion, and when I walk out of the meeting I can merge any new intelligence I've gathered right into my indispensable data base of contacts, appointments, projects, and plans. And I'm hardly ever out of voice contact with the home office for any length of time. So am I happier, more productive, more useful? Wait—let me answer this telephone call...I mean, appointment alarm...I mean...!

(continues)

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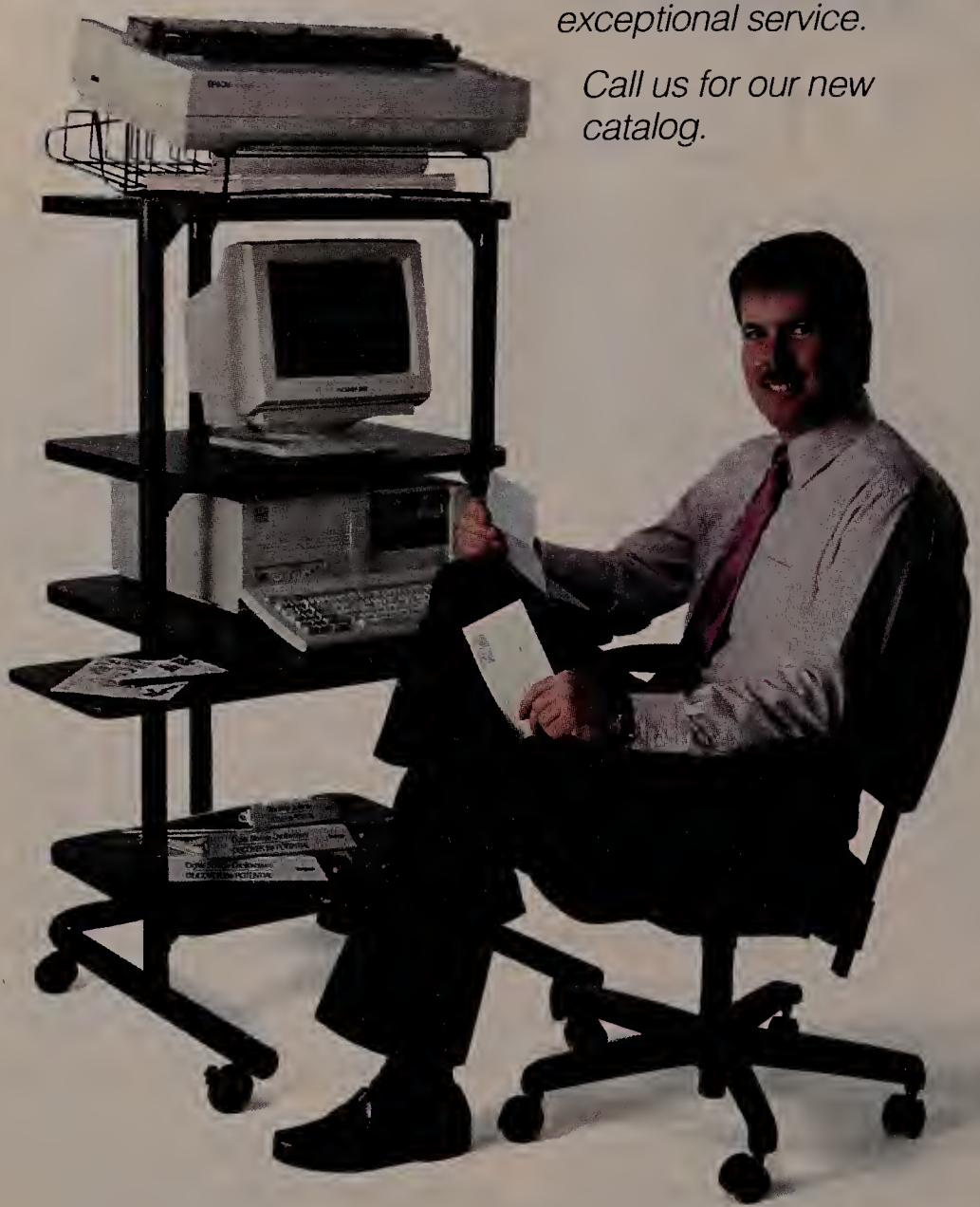

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RICHARD LANDRY

Good-bye, PC World

You might wonder *why* an editor spends so much time on the road. In my case, the answer is simple—for the last several months I've been hard at work gathering advice and support for a new IDG magazine designed to track the coming explosion in multimedia hardware and software for IBM-compatible PCs. Called *MPC: The Multimedia PC Magazine*, the publication will debut later this fall, right here in the pages of *PC World*.

Multimedia personal computing will irrevocably change the way you think about PCs.

Multimedia personal computing will irrevocably change the way you think about personal computers at work, at home, and in education. Read all about this new territory, and the new magazine dedicated to exploring it with you, in next month's issue.

This new adventure brings to a close my tenure as editor-in-chief of *PC World*. It's been a wonderful four years, during which I've enjoyed the chance to receive your letters and talk with many of you by phone or in person. I've also had the great pleasure to work with the most wonderful staff in PC journalism. Now my successor, Philip Lemmons, formerly of *Byte* magazine, has that same honor. Phil is the kind of journalist who cares deeply about readers—your ideas, opinions, and needs. *You* get a chance to meet him next month, in this very spot.

Good-bye, and thank you for everything! As always, I'm interested in your opinions on this or any other subject. Write to me at *PC World*, 501 Second St. #600, San Francisco, CA 94107; fax 415/442-1891; MCI Mail Richard Landry/301-3685.

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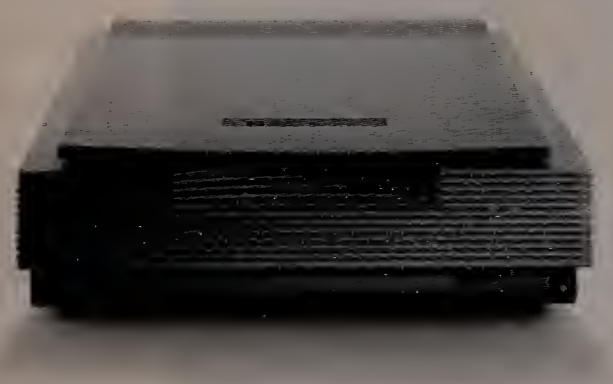

needs to make one pass. So you scan color images faster than you can click your heels three times.

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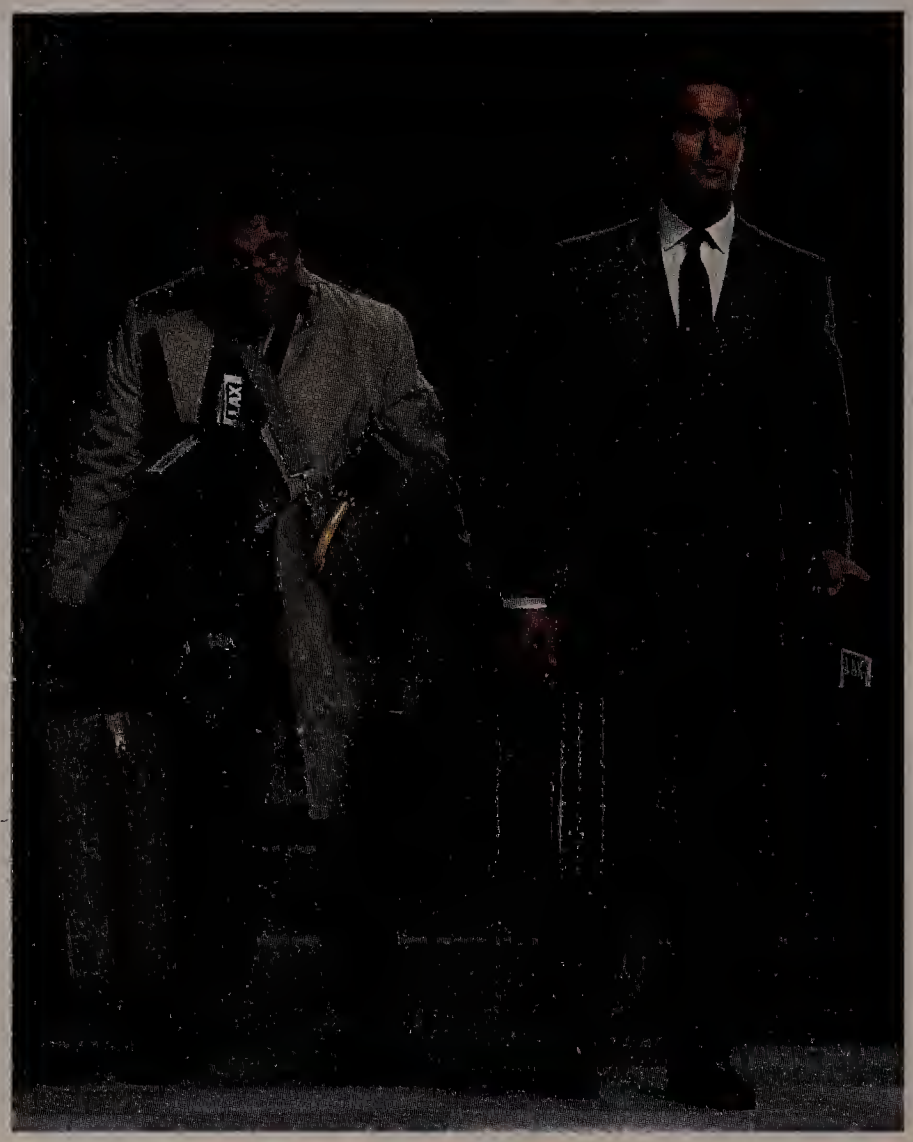

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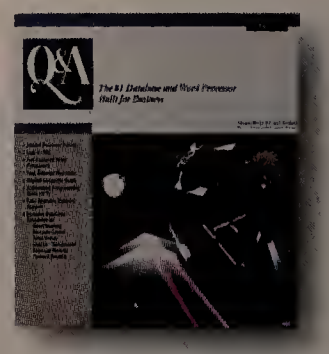

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LETTERS

Reactions and responses from the PC World community

ROBERT DE MICHIELL

ANTHONY RUSSO

What Price Piracy?

Software piracy is a major headache for software companies. No matter how hard publishers try to prevent illegal duplication, the number of users far exceeds the number of licensed copies. But why don't otherwise honest people honor the rights of software publishers? Cost is one probable reason. After all, a full-featured commercial word processor costs as much as a four-headed VCR. But look at *Windows 3.0*—it enjoys brisk sales because it provides great function at an affordable price. DOS 5.0, with street prices well under $100, will be another winner. I think publishers can make far more by licensing products at reasonable rates than by setting high prices, selling few legitimate copies, and being buried in an avalanche of illegal copies.

James Wang
Cerritos, California

Racy Reading or On-the-Job Training?

In his July letter, reader Wong Chong and his co-workers praised *PC World*, but he said he hoped their boss won't catch them "reading it on the job." That makes *PC World* sound like a racy publication. But I've never seen any centerfolds of PCs stripped of their covers, adapter cards exposed and seductively posed! Seriously though, bosses should be *encouraging* workers to read *PC World*. And Wong Chong should be proud. Where else can he get such economical on-the-job training?

J. Ed Lenarcic
Toronto, Ontario, Canada

The Right Kind of Coverage

I was debating whether I wanted to renew my subscription with one of your competitors when I came across the June issue of *PC World*. I was amazed to find this one edition covering three subjects I need to know about: 386SX computers, *Windows* word processors, and desktop publishing. The next day I decided to try a subscription to *PC World*. I'm hoping that future issues will be just as helpful. And by the way, I've decided not to renew the other subscription I had.

William J. Oehlkers
Barrington, Rhode Island

When I picked up the July issues of *PC World* and *PC Computing*, I couldn't help but notice two conflicting points of view. In an article on OS/2, *PC Computing*'s John Dickinson said "OS/2 is dead. Kaput." But in your *Industry Outlook* item ["IBM Counteroffensive Bolsters OS/2—Finally"], Eric Bender makes OS/2 sound alive and kicking. In fact, OS/2 2.0 sounds as if it will be far more capable than *Windows*. Who's right? And how can two experts be so far apart on such a crucial issue?

Keith Clark
Highlands Ranch, Colorado

With more than 4 million copies sold and hundreds of developers solidly behind it, Windows *is unquestionably the mainstream graphical environment for PCs. But many Fortune 1000 firms have kept the faith with OS/2 and invested heavily in it. And if IBM delivers on its promises, OS/2 2.0 will be a far more powerful platform than the upcoming* Windows 3.1, *and will give these corporate users solid reasons to remain in the OS/2 camp. —Eric Bender*

PCs Take the Desert by Storm

You've heard about the dedicated personnel and all the sophisticated weaponry—well, PCs were on duty too during Operations Desert Shield and Desert Storm. I was astonished at the punishment our Zenith Data Systems desktop unit took. Our worst enemy (aside from the Iraqis) was the sand, which made our lives a living hell. The floppy drive got noisy, but our only malfunctions were with the keyboard, which had to be cleaned repeatedly to stay in service. Our five-month stay in the desert heat showed the kind of stuff an everyday civilian PC is made of.

Staff Sgt. David V. Blue
APO New York

(continues)

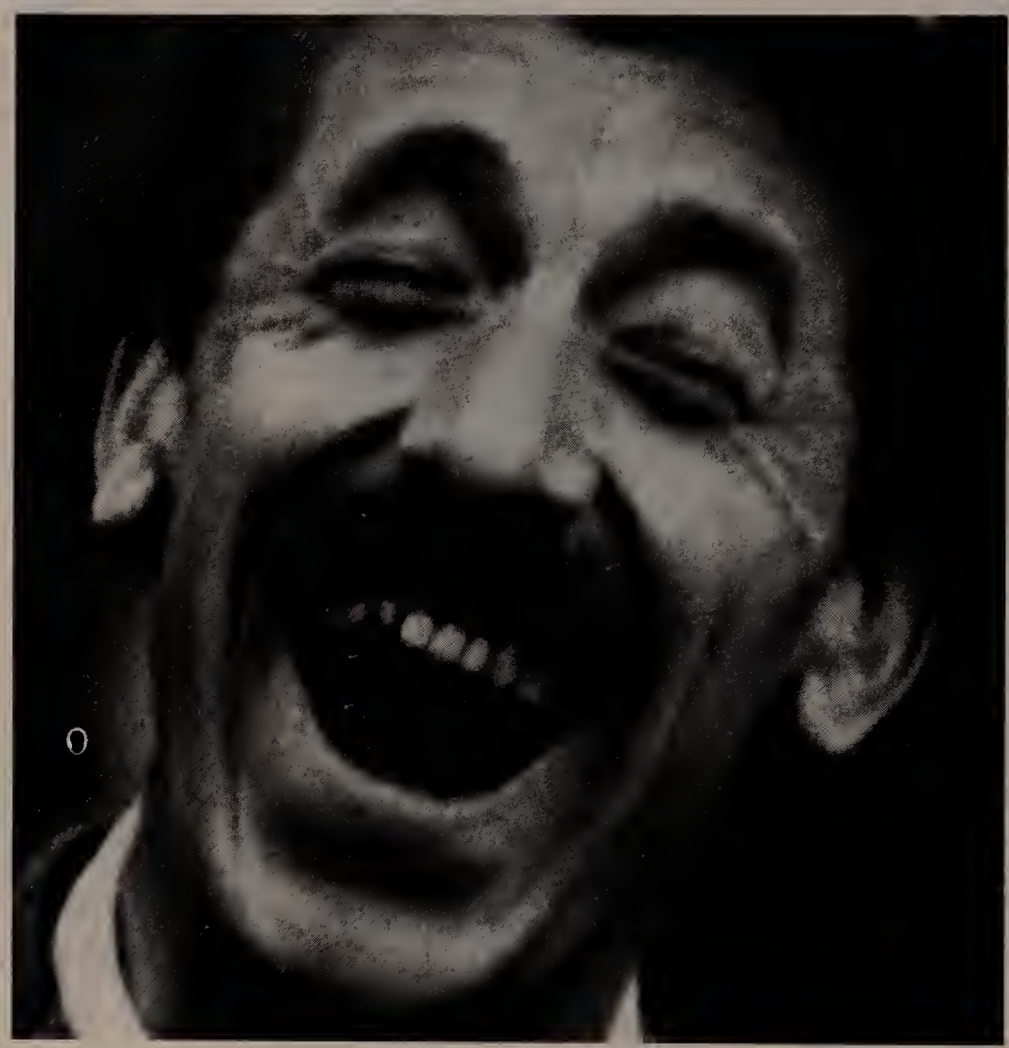
Upgrading to DOS 5.0

I've been using DOS 5.0, and everything that you said about it in the July issue ["DOS Does It Right"] appears to be true. The memory management is far better than with any other DOS version to date. I'm using a 286 clone, and running DOS 5.0, I can get 595K of usable RAM. I read *PC World* from cover to cover every month—keep up the good work!

William R. Stamm
Birmingham, Alabama

Congratulations on an excellent and factual article. As a computer educator, I'd like to be able to provide students with the latest software technology. And I have no reservations in recommending DOS 5.0 to new users. But DOS 5.0 doesn't add any significant features not already available in combinations of DOS 3.3 and existing utilities. For those in our position, with existing investments and limited budgets, I can't see sufficient reason to upgrade. So reluctantly, I'm suggesting that our college not migrate to DOS 5.0.

Stephen I. Klein
Mahwah, New Jersey



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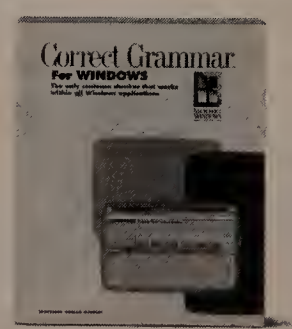

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Circle 312 on reader service card

Examining Data On a Personal Basis

In your July review ["Data Management: Up Close and Personal"], you say Microrim's *Personal R:base 1.0* is "good for the long haul." Based on experience, I'd call your statement overoptimistic. Just four years ago we paid twice *Personal R:base*'s current *list* price for *System V*. When we called Microrim's $2-a-minute support line recently to find out if the company's *System V* would run under DOS 4.01, the representative told us he didn't know. Further, Microrim said *System V* is an old product and the company no longer supports it. So what kind of support do you think you can expect for *Personal R:base* in a few years? Maybe it is the best personal data base available right now—but should you buy it for the long haul?

Herbert Shprentz
Irvington, New York

I don't use any of the other personal data base programs you reviewed in July, but I'm very experienced with *Q&A 3.0*, and I think you've slighted this capable product. At work I'm constantly told, "I don't think you can do that in *Q&A*." The same people usually wind up saying, "I didn't know you could do that in *Q&A!*" I admit the program can be clunky for the inexperienced, but once you master the nuances, it does a great job.

Joseph C. Palermo
West Nyack, New York

(continues)

The AcerPower 486SX.

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Corrections and Clarifications

Our August Executive Summary for the review "Screen Gems: Super-VGA Boards" should have rated STB's performance and flicker-free support as Excellent. With these two top grades, STB PowerGraph Ergo-VGA earns a Best Buy. The Features Evaluation should have stated that the STB has flicker-free support at 1024 by 768 resolution. For more information, contact STB Systems, 1651 N. Glenville #210, Richardson, TX 75081, 800/234-4334, 214/234-1306 (fax). *PC World* regrets the errors.

The Features Evaluation for "Screen Gems: Super-VGA Boards" should have reported Boca Research's Best Buy SuperVGA as having 10 hours of technical support daily.

The AcerPower 486SX we described in the July preview "486SX Systems: More Bang, Less Bucks" is actually chip-level CPU upgradable. And Acer states that you can install a 33-MHz 486DX without having to remove the 486SX processor, and without having to change any hardware or software configurations. With presently available 8MB SIMMs the Acer offers a 26MB RAM ceiling; but when 32MB SIMMs become available, as expected within the year, the unit will support up to 98MB RAM.

Since our July Buyers' Guide "Antivirus and Security Products" went to press, Ontrack Computer Systems has made a number of changes to *Dr. Solomon's Anti-Virus Toolkit,* which allow the program to detect efforts to bypass DOS; block writes to COM, SYS, BAT, EXE, overlay, and driver files; and block changes to boot sector/partition tables. The program can now also block low-level hard disk track writes and stop viruses from becoming resident in the computer's RAM. *Dr. Solomon's Anti-Virus Toolkit* still blocks unauthorized hard disk formats only if they are caused by a virus. You can contact Ontrack at 6321 Bury Dr., Eden Prairie, MN 55346, 800/752-1333, 612/937-5815 (fax).

The July security products Buyers' Guide contained an error in reference to Harcom Security Systems' *PC Watchman,* which does prevent hard disk access if the system booted from a floppy disk. Contact Harcom Security Systems, 130 William St., New York, NY 10038, 212/766-1802.

Send your reactions, responses, and ideas to Letters, PC World, *501 Second St. #600, San Francisco, CA 94107; CompuServe 74055,412; MCI MAIL PC World Editorial; or 415/442-1891 (fax). Include your name, city and state, and phone number. We reserve the right to edit letters.*

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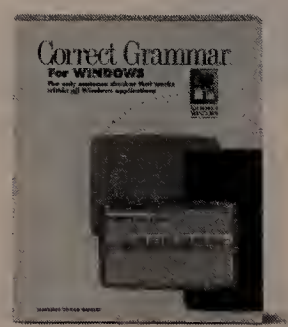

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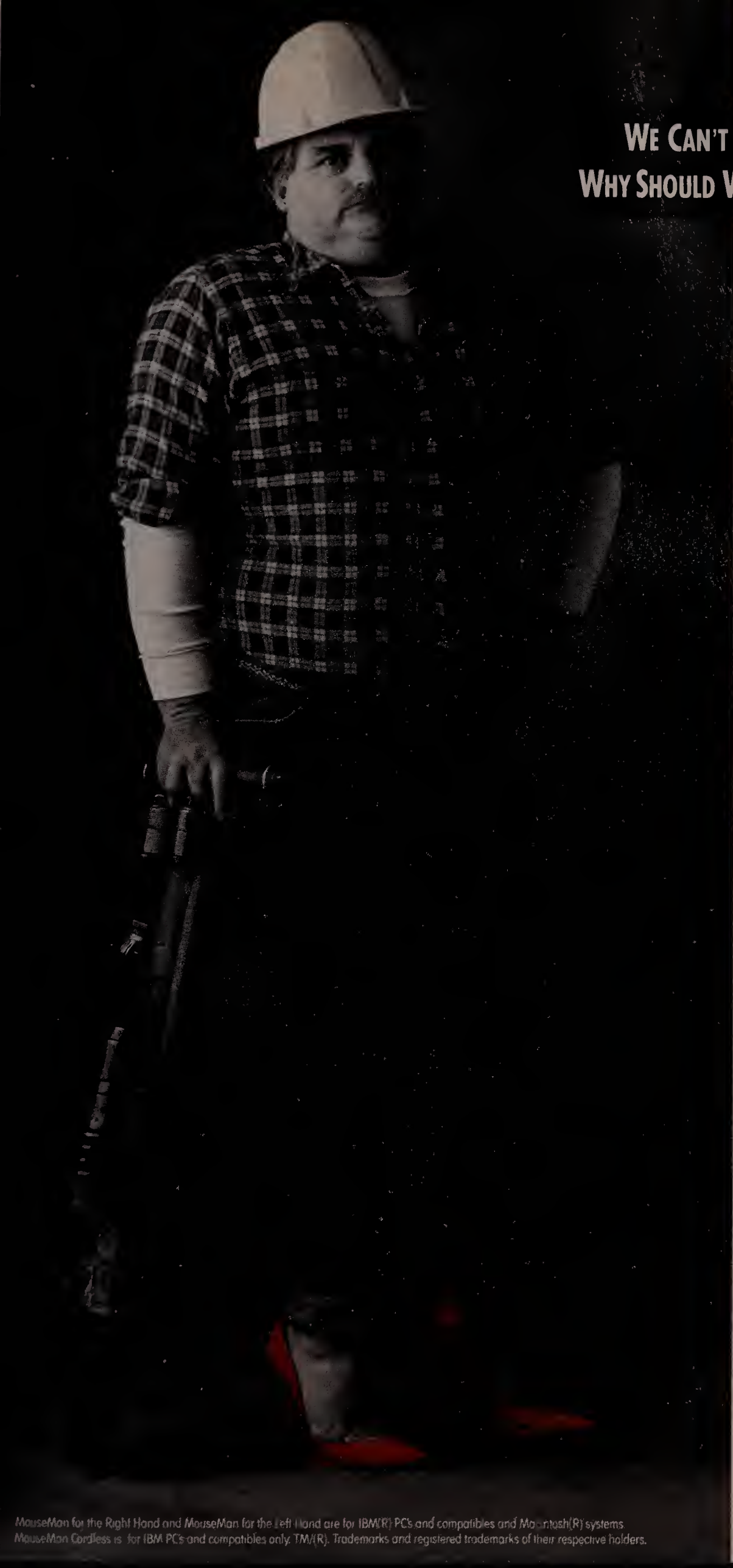
Circle 312 on reader service card



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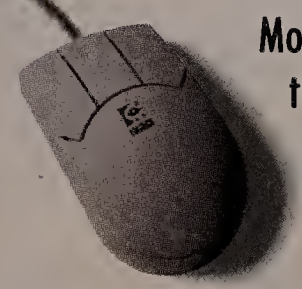

MouseMan for the Right Hand

MouseMan for the Left Hand

MouseMan Cordless Radio Mouse

For more information, call:

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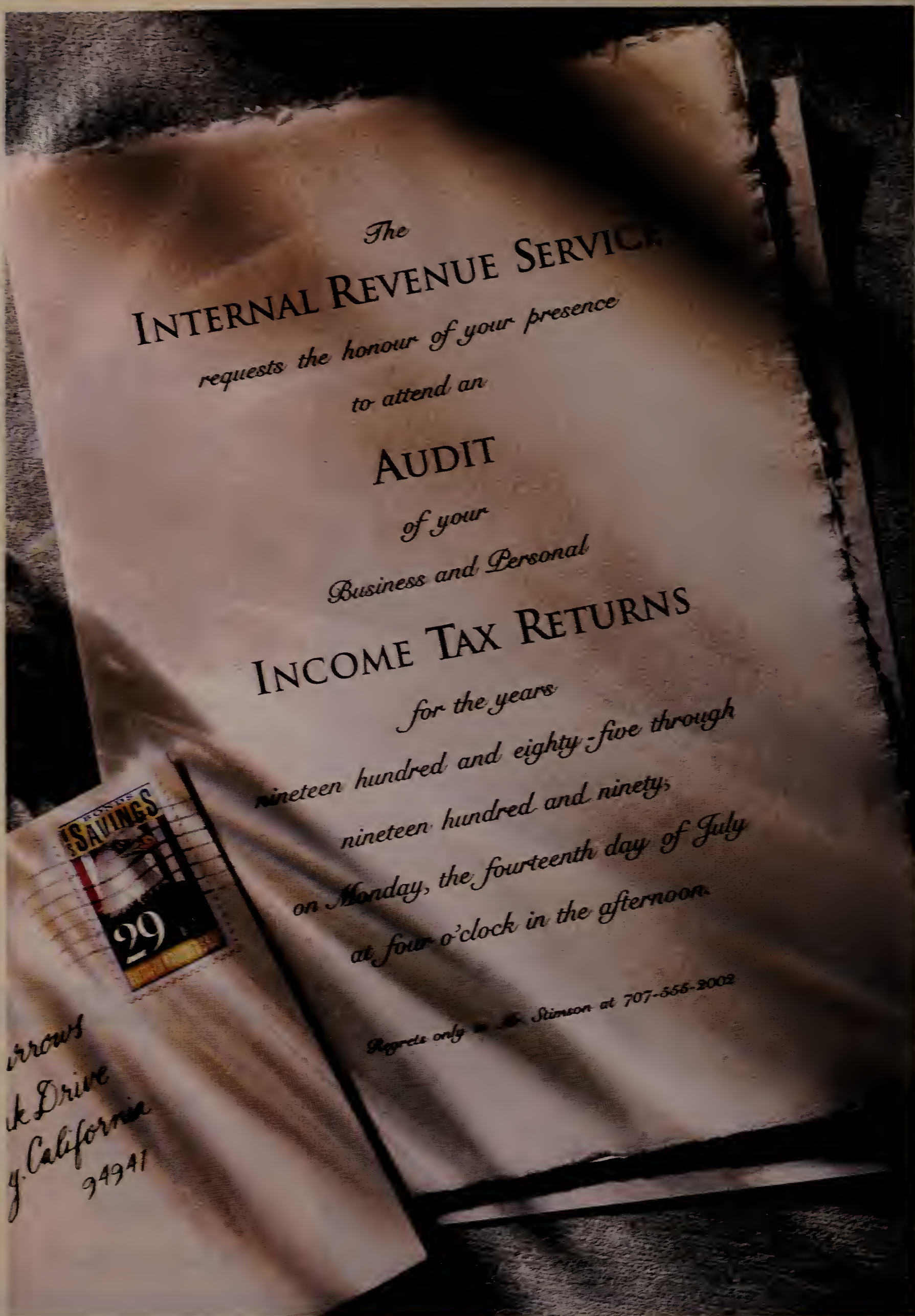

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The Right Typeface
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BAD NEWS
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We offer the example at left as a simple demonstration of the power of type. Why, if a typeface can make a letter from the IRS appear inviting, think what it could do for your documents.

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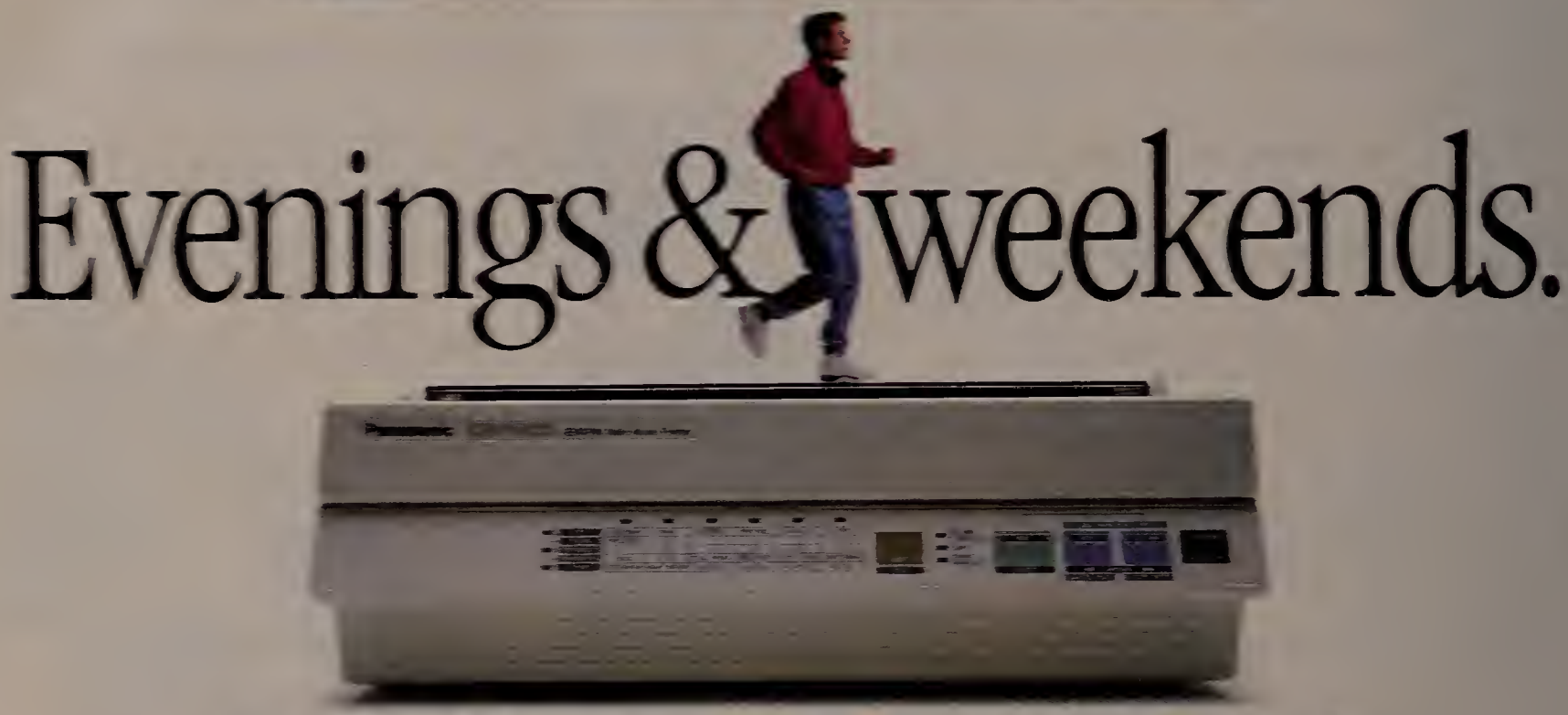

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*The Panasonic KX-P1124i. Based on US dollar share of competitive models for the 12 months ending December, 1990, as reported by InfoCorp. (1/91).

Circle 231 on reader service card

THE HELP SCREEN

PC World offers answers and advice at every level

Karl Koessel and Robert Lauriston

Smart Footers for 1-2-3 and WordPerfect

Q. *Where I work we use* 1-2-3 *release 3.0 and* WordPerfect 5.1. *I want to have the date, path, and file name appear in a footer in all my documents. I'd also like the footer to update automatically so it always shows the current date and path. How can I do this?*

Douglas Noga
Rochester, Minnesota

A. *1-2-3* release 2.2 and later versions can do exactly what you describe. First, enter the formula **+"¦"&@CELLPOINTER("filename")&"¦@¦#"** in any cell.

Then, in the footer, type a backslash followed by the address of the cell containing the footer formula. For example, if the formula were in cell A10, you'd enter \A10 in the footer. If your spreadsheet is set for manual recalc, be sure to press <F9> to recalculate before you print.

WordPerfect has no provision for automatically updating footers. The best work-around we've come up with is a print macro (see **FIGURE 1**). This macro positions the cursor at the top of the document, creates a footer with the date, path, and file name, prints the whole document, and then deletes the footer code.

Password-Protect Your Files

Q. *Is there any way I can password-protect my data and program files?*

A. J. Hwang

A. There are lots of options for password-protecting data files. Some applications have the capability built-in: For instance, *WordPerfect* (<Ctrl>-<F5>P) and *Excel* (File Save as Options) both allow you to assign a password to a document before you save it. Thereafter, only those who know the password can retrieve the file. Also, all the major utility libraries, including *Mace*, *Norton*, *PC Tools*, and *WordPerfect Office*, include password-protection utilities. And DR DOS users can use its PASSWORD command to protect files and subdirectories.

Assigning passwords to executable files is more difficult. Generally, it requires a memory-resident security utility with the ability to protect individual files. (See the table on page 248 of our July 1991 Buyers' Guide "Antivirus and Security Products" for a list of such programs.) We found one shareware utility, UCPASS.EXE, that modifies COM and EXE files so they prompt for a password before running. The author warns that it won't work with all programs, but we tested it successfully on several popular applications. If you can't find UCPASS on your favorite BBS, you can order it directly from the author.

WHERE TO BUY

UCPASS.EXE
G. H. Ford
8131 Silo Ct.
Severn, MD 21144
LIST PRICE: $15
Reader service no. 695

Use COM3 and COM4

Q. *I have peripherals attached to all four of my computer's serial ports. My problem is that some of my software supports only COM1 and COM2. Is there some way to get these programs to use COM3 and COM4?*

Stan Bukowski
Cicero, Illinois

A. Port Finder, a $10 shareware utility available from most BBS's, lets you "swap" COM ports so programs that talk only to COM1 and COM2 can access COM3 and COM4 too. Note that for better performance, programmers often write software that controls the se-

(continues)

```
{DISPLAY OFF}
{Home}{Home}{Up}
{Format}PFBP
{Date/Outline}T, {SYSTEM}path~{SYSTEM}name~
{Exit}{Exit}
{Print}F
{Backspace}{IF}{STATE}&1024~Y{END IF}
```

FIGURE 1: This WordPerfect macro creates a footer with the date, path, and file name, prints the whole document, and then deletes the footer code.

ANTHONY RUSSO

rial port hardware directly. Such programs may work only with the COM ports specifically coded in the software.

Floppy Fits

Q. *I recently attempted to copy 247 files from my hard disk to a high-density 3½-inch floppy disk. After the 224th file, I got a 'File creation error' message and couldn't copy any more to that disk. Since CHKDSK showed there was still plenty of room on the floppy, I deleted one of the files, created a directory, and copied the rest of the files to the new directory. However, it seemed like the floppy was having trouble copying to that directory—each file took 10 to 15 seconds, and the drive made an annoying sound. Am I doing something wrong?*

Dakshesh Patel
Beltsville, Maryland

A. No, the noise you heard was simply the drive head shuttling repeatedly between the disk's outer tracks and inner tracks. Because a floppy drive's heads actually press against the disk (similar to the way a cassette recorder's heads press against a tape), the drive makes noise when the disk is spinning, and the noise often sounds different when the heads are also moving.

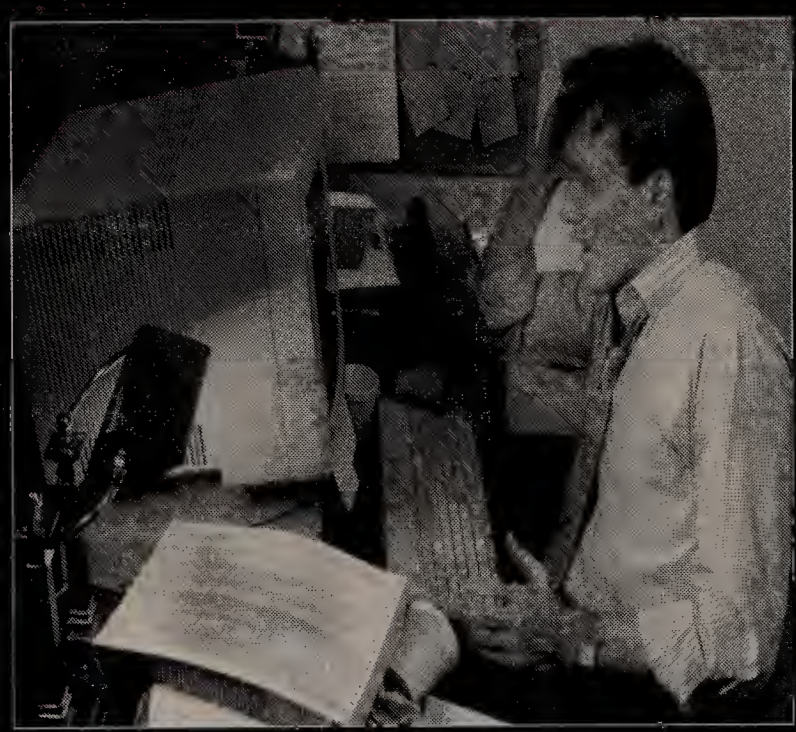
As you discovered, the 1.44MB format allows a floppy disk to hold up to 224 entries (file names, root subdirectory names, and the disk's volume label) in its root directory. That's because when you format a disk, DOS sets aside a section for the root directory, and that section's fixed size determines the maximum number of entries the root can hold. (Only the root directory has such a limit—subdirectories are actually files and therefore can grow.)

A 1.44MB disk has 2847 allocation units (clusters) of 512 bytes each. Files are stored in clusters—a file of 1 to 512 bytes occupies one high-density floppy cluster, a file of 513 to 1024 bytes (1K) occupies two such clusters, and so on. Therefore, you can store thousands of files on a 1.44MB disk as long as the files are small and, as you seem to have known, you use subdirectories.

To keep track of which clusters are in use and which are still available, DOS keeps a File Allocation Table (FAT) in clusters 1 through 18, which occupy the disk's outer tracks. Each time DOS wants to write data, it must check the FAT to find out which is the next available cluster, then move the head over that cluster's track, wait for the appropriate cluster to spin beneath the head, then write the data, check the write, move the head back to the FAT, and mark that cluster's FAT entry to indicate that the cluster is now in use. Writing a large file requires repeating

(continues)

So You're Feeling Squeezed



Ouch. Another typical day at the office — rush projects, training seminars, capital crunches and trade shows — just for starters. No need to panic. *Now there's help.*

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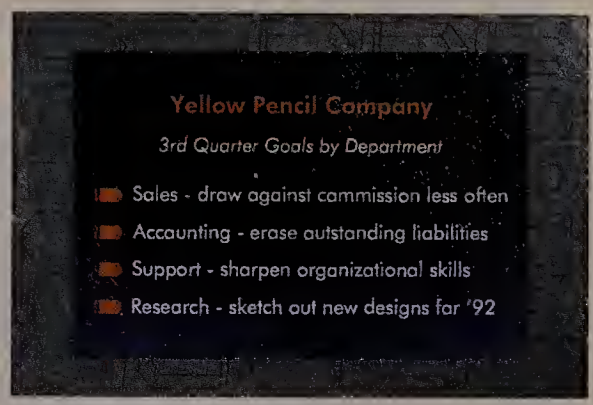
Once you try it, you'll understand why. Charisma's extensive word and data charting functions, real drawing capabilities and total user control make it the most complete graphics solution for business. Unfortunately, some people have trouble resisting the temptation to use every Charisma feature on every presentation. That's understandable. When you have access to 16.8 million colors, more than 40 fully editable fonts, thirteen drawing tools, a library of 2200 clip art images and the ability to turn any graphic element into a bullet, it's easy to get a little too enthusiastic.

It's just as easy to get overly excited about the way Charisma lets you assemble entire presentations without switching between word processing, graphics and spreadsheet programs. Plus you see the results of your creativity immediately, since Charisma doesn't make you go back and forth between text and graphic screens. And with more than 30 import and export filters for graphic formats—including Harvard Graphics—Charisma gives you more power and control than ever before.

Add visual interest and keep audience attention focused with freeform illustrations or custom edited clip art. One graphic per chart works best.

Break out information logically and understandably with a variety of chart types. Then use the Harmony Palette for a unifying blend of just the right colors.

But you shouldn't expect any less from a program designed specifically to take full advantage of the Windows environment. Now, even without overdoing it, you can output the most provocative business graphics you've ever seen to 35mm slides, overheads and handouts. Or make your point with SlideShow, Charisma's on-screen graphics presentation utility that includes dozens of transition effects.



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Circle 183 on reader service card

the process many times. And because moving the head across tracks is time-consuming, writing data to inner tracks takes longer than writing to tracks closer to the FAT.

Add a Speaker Volume Control

Q. *Your June 1991 item "Quiet on the Set" referred to a "potentiometer volume control" for adjusting speaker volume. Where can I purchase such a device?*

Donna J. Walker
New York, New York

A. You can order one by mail from Gwalia Enterprises in Canada. The company's PC volume control kit, Sound-Off, consists of a volume control knob and earphone jack mounted on an expansion slot cover bracket. The kit also includes installation instructions and a couple of solderless connectors for those who aren't very handy with a soldering iron.

WHERE TO BUY

Sound-Off
Gwalia Enterprises, Inc.
31-474 Southdale Rd. E
London, Ontario
N6E 1A4 Canada
519/680-0110
LIST PRICE: $18.79
Reader service no. 696

Display 132-Column Text

Q. *To reduce the amount of paper we use, we're encouraging people to view reports from our AS/400 on their PC screens instead of printing them out. Some of our reports are 132 characters wide, though, and are so hard to read on screen that users prefer to print them out. Are there monitors that can display 132 characters across?*

Norm Bowman
Grand Forks, North Dakota

A. Almost all popular super-VGA boards can produce 132-column text, usually with a choice of 25 or 44 horizontal lines. A special software utility included with the board enables you to switch between modes, and enhanced drivers for major applications like *1-2-3* and *WordPerfect* are also included. You'll need a monitor that can handle 800 by 600 super VGA to display these modes. (Compaq systems are a special case—some models can display 132-column text but not super-VGA graphics.) Many users will find 132-column type unreadable on anything smaller than a 16-inch monitor.

Ease dBASE Report Programming

Q. *To simplify programming my* dBASE III *reports, I've written a series of one-line subroutines. Each issues one of the various print commands I use to control our Epson-compatible printers. Now when I write a report, I just call these programs and never have to look up printer escape sequences.*

(continues)

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Features:	NETROOM	QEMM	386 MAX
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Special DOS 5 support	✔		
Converts Ext. to Exp.*	✔	✔	✔
Relocates to High-DOS	✔	✔	✔
Relocates to LIM 3.2 Frame	✔		
Relocates to Expanded	✔		
Relocates to Extended	✔		
Works on 386/486	✔	✔	✔
Works on 8088/286	✔		
Memory Analysis Utility	✔		

*Requires NEAT CHIPSet on 286 systems.

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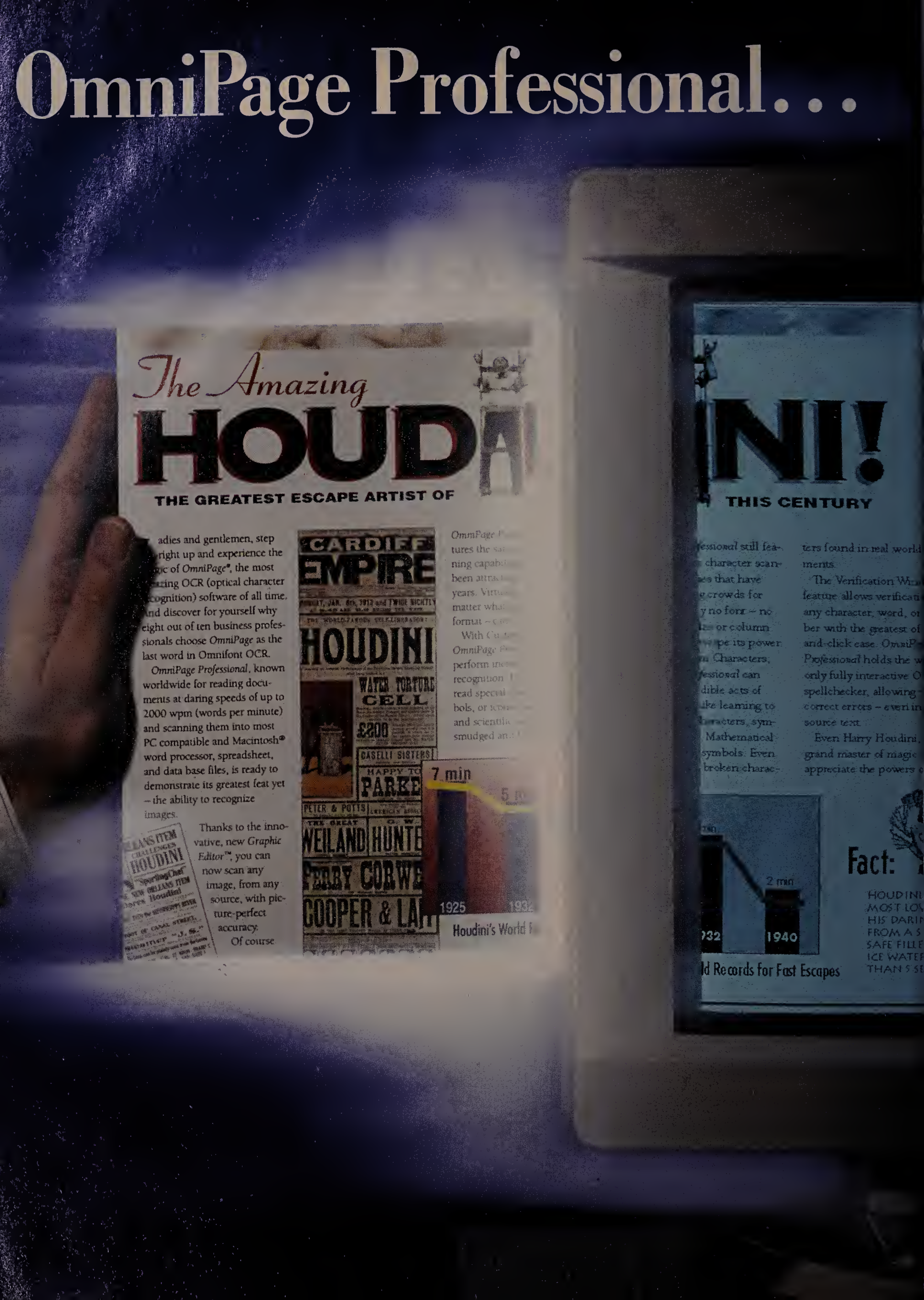
OmniPage Professional...



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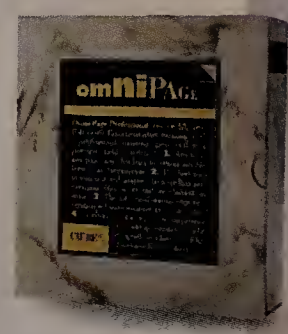

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This approach works fine, except that I can't turn off the "double-high" mode without resetting the printer. I've tried sending these commands from spreadsheets and word processors as well, and have not had success. Please advise.

Eric Vitols
Cheshire, Connecticut

A. Thanks for sharing your trick for avoiding the tedium and confusion of entering printer control codes every time you create a report. As for your problem—on Epson dot matrix printers, Esc-w1 (ASCII 27-119-1) turns on double-high, and Esc-w0 (27-119-0) turns it off. If your printers don't respond to those commands, the problem is in their Epson emulation, not your programming. In that case, a ROM upgrade from the printer manufacturer might solve the problem.

Send your questions to Robert Lauriston, CompuServe 73707,1731; MCI Mail 381-7106; Internet duck@well.sf.ca.us; or 415/442-1891 (fax); or mail them to The Help Screen, PC World, *501 Second St. #600, San Francisco, CA 94107.* PC World *pays $50 for published questions. Sorry, we cannot acknowledge submitted materials.*

Karl Koessel is the technical editor and Robert Lauriston a contributing editor for PC World.

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POWER TIP NO. 212

Follow the Dots to Neighboring Directories

Most users know DOS's * and ? wild-card characters, but DOS also recognizes two consecutive periods (..) as an alias for the current directory's parent directory. Using the "double-dot" alias, you can stay in the current directory and load files from, or save them to, a directory on the same or a neighboring branch using a minimum of keystrokes. For example, if you're working in the \APPS\DATA\FILES subdirectory and want to retrieve a file called FILE1 from the \APPS\DATA\ARCHIVE directory, you can specify **..\archive\file1**. Or if you want to load \APPS\DATA\FILE2 from the current directory's parent, you can specify **..\file2**, as each .. takes you back one level.

G. Jonathan Cox
Orem, Utah

The TI TravelMates.
They're making a hit coast to coast.

The new look of power.

Editors across the country are praising the performance, size and weight of the Texas Instruments TravelMate™ 2000 and 3000 notebook computers.

"The TravelMate is as close as you can get to the ultimate portable." – *BYTE*, November 1990.

"Now TI assumes the lead in performance/pound/price measure of a notebook."– *PC Magazine*, December 11, 1990.*

"Not until you hold this computer in your hands do you begin to understand what sets it apart from the pack."– *PC Computing*, December 1990.**

Both TravelMate models are only 8½" x 11" in size, including a hard disk drive, and feature a 10" diagonal VGA display and comfortable full-function keyboard.

With the TM 2000 you get 286™ processing in a computer that's 1.4" thin and 4.4 lbs. light. The TM 3000, meanwhile, packs 20MHz 386™ SX power into a mere 1.8" and 5.7 lbs.

Find out how to take the new look of power with you coast to coast. Or wherever your work takes you.

For the name of the dealer nearest you, call 1-800-527-3500.

TEXAS INSTRUMENTS

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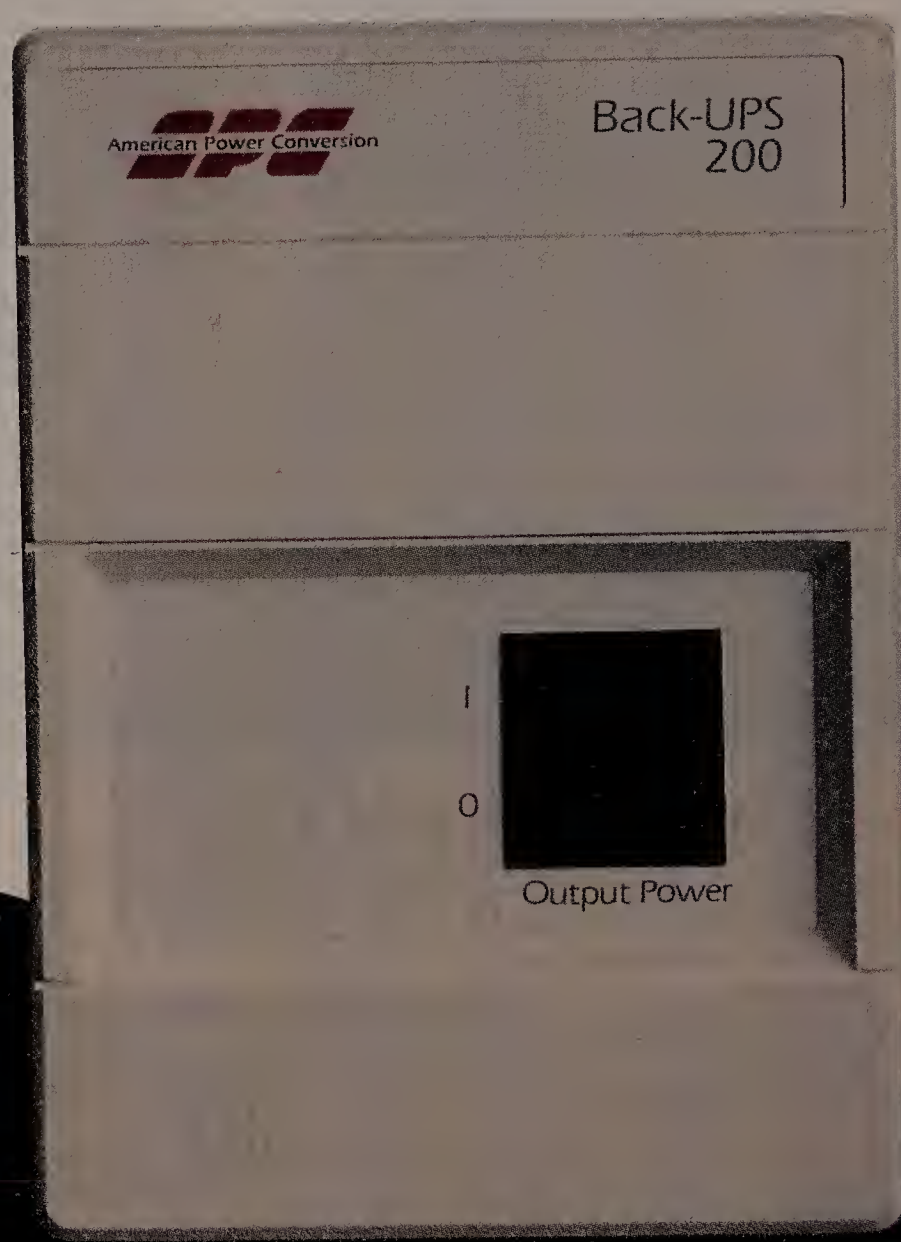
NOW SUPPORTS ARTISOFT'S LANTASTIC 4.0

Get a hold of the best value in power protection for just $199

suggested list price



Blackouts, brownouts, sags... Your data and hardware are vulnerable to problems that surge suppressors are just not designed to handle.

Now there's a complete Uninterruptible Power Supply solution. The Back-UPS™ 200 is reliable protection for LAN nodes, 286, 386SX machines, small PS/2 systems, and inter-networking devices such as routers, bridges, gateways and hubs.

From the largest server to the smallest router, the Back-UPS series provides a cost-effective solution. **Call for your free power protection handbook.**

Circle 45 on reader service card

- Full-time surge protection and line filtering
- Models from 200 to 1200 Volt-Amps, many with LAN interface
- Novell approved with a 2 year warranty
- Rack Mount, Extended Runtime, 220V models available
- Ask about PowerChute® UPS monitoring software and Novell-compatible UPS monitoring boards

LAN TIMES READERS CHOICE 1990 LAN TIMES READERS CHOICE 1991

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by American Power Conversion

800-541-8896, Dpt. P3

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NETWORK Q&A

The Pros and Cons of Diskless Workstations

Keith Nickerson

Q. *We're considering installing diskless workstations on our LAN. What are the pros and cons of diskless workstations versus standard PCs with local disk drives?*

Chuck Bowdler
Baton Rouge, Louisiana

A. The only practical use for diskless workstations is to enhance the security of the data on your network. Without floppy drives, end users cannot download company data, thereby reducing the likelihood of a disgruntled employee or industrial spy absconding with copies of your financials, lists of client contacts, or trade-secrets files. But aside from preventing local downloading, diskless workstations aren't much more secure than conventional PCs. And most of the other supposed benefits of diskless workstations also evaporate under careful scrutiny.

Since diskless users can't upload data to the file server, they can't fill the file server's disks with personal files and less-than-critical information, or introduce viruses to your network. However, NetWare and most other network operating systems already allow you to set a limit on the number of kilobytes each user can store on the server, and you can protect against virus infections by installing a network antivirus utility.

Going diskless won't save you much money, and it could cost you extra. While you can cut a couple hundred dollars off a standard system's price by leaving out the drives, specially designed diskless workstations are often relatively expensive. They're also not very expandable—you may get only one or two free slots, limited RAM capacity, and built-in video and network interface circuitry that can't be upgraded.

One major disadvantage of diskless workstations is that they're unusable when the server's down. Given a bit of advance planning—for example, having copies of key applications loaded on local disks or easily available on disk or tape—users with hard disks and floppy drives can keep working, server or no server.

Local disks have several other advantages. Users can back up their own data off the network, providing an additional set of backups. Applications used by only a few people can be stored on local hard drives, reducing the amount of disk space needed on the server. Users can take electronic files home to work on. Many applications, like *WordPerfect, Paradox,* and *Windows,* create temporary files, which can take up several megabytes of disk space. Creating these temporary files on local drives speeds up the application, saves server disk space, and reduces network cable traffic.

Diskless workstations can make network upgrades a hassle. When users have local drives, upgrading NetWare on a workstation generally consists of replacing two small files, if that. On diskless workstations, it often requires disassembling the computer to replace a $50 ROM chip.

Finally, diskless workstations may reduce employee morale and productivity, especially among self-starters who have used PCs previously. They may feel the company doesn't trust them and is playing Big Brother by telling them which applications to use and where to store files. These feelings aren't unfounded—one major advantage of PCs over minis and mainframes is that PC users can organize their data and configure their applications to fit their work habits.

If you decide the extra security of diskless workstations is worth the trouble, you can hedge your bet by purchasing diskless versions of conventional PCs, like the Compaq Deskpro 386N. That way, you can use any network or expansion boards you wish, add hard drives for local storage, and even install floppy drives to convert the computers to regular PCs.

Send your network questions to Keith Nickerson, CompuServe 70523,470; MCI Mail 326-2108; 713/993-9249 (fax); or mail them to Network Q&A, PC World, *501 Second St. #600, San Francisco, CA 94107.* PC World *pays $50 for published questions. Sorry, we cannot acknowledge submitted materials.*

Keith Nickerson is the editor of NetWare Advisor *and a member of the publishing team at Business Systems Group, a Houston-based systems integration firm.*

POWER TIP NO. 213

Peeking Under Quattro Pro Menus

If you have a menu pulled down over a *Quattro Pro 2.0* worksheet, and you want to peek at the worksheet without losing your place on the menu, just press <F6>. Only the active window is uncovered, and you can't scroll the spreadsheet while peeking—but you can see the sheet you were working in when you activated the menu. Pressing <F6> a second time brings you back.

Robert J. Sandler
New Milford, New Jersey

With all this acclaim, you

"The MSF-300Z color/gray scanner is a breakthrough product in price, image quality and value. Microtek has set a clear standard for affordable, quality color scanning."
MacUser March 1990

MacUser
1989
EDITORS' CHOICE AWARD WINNER

"At $2,695, Microtek's scanner isn't only the least expensive flatbed scanner we looked at, it's also the best."
Publish March 1990

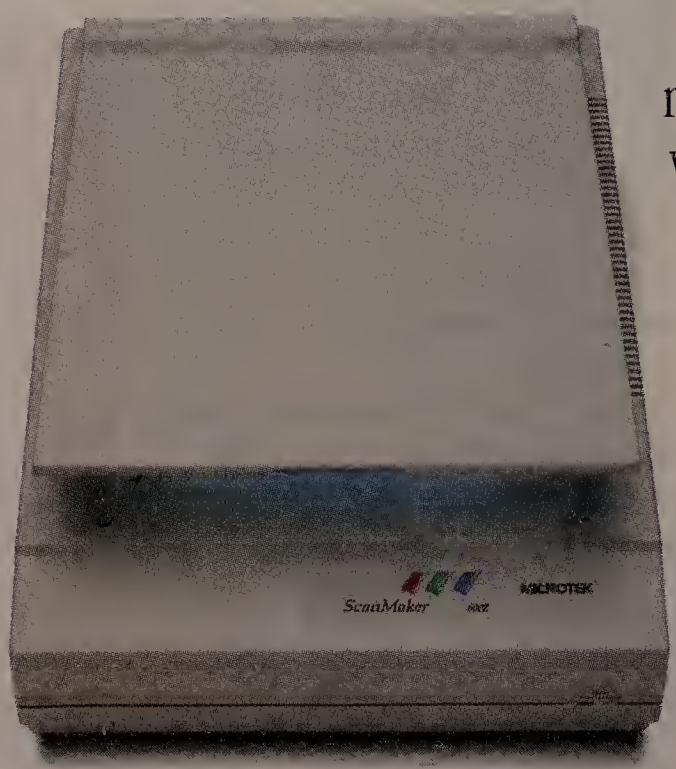
★★★★★
FIVE STAR AWARD 1990
Publish

Guess

Introducing the ScanMaker family of affordable flatbed and slide scanners.

Microtek's color scanner has consistently earned awards, praise and top ratings as the best value in scanning. But, if you thought we'd rest on our laurels, we've got news for you.

The leader in high quality, low cost scanning is at it again with the ScanMaker 600Z. The all new ScanMaker 600Z is the perfect tool for desktop publishers who demand outstanding image quality and versatility in a flatbed scanner.



The totally redesigned ScanMaker 600Z offers higher resolution for a lower price.

From presentations and newsletters to pre-press and comp work, the ScanMaker 600Z handles it all. It boasts 24 bit color, 8 bit gray-scale and an incredible 600 dpi resolution.

But the most dramatic news is that we've given it an incredible low price to match.

Add to that a sleek, compact design that fits neatly in your work space. And you've got the color scanner that others will be hard pressed to match.

Both ScanMaker models include either PhotoStyler or Adobe Photoshop, absolutely free.

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I think we'd be satisfied.

"If you need color, we recommend the Microtek MSF-300Z. It's the least expensive full-sized color/gray-scale scanner..."

MacUser September 1990

FOUR MICE RATING 1990
MacUser

"...the Microtek MSF-300Z is a clear winner, again, because it comes complete and the software is easy to use."

Macworld August 1990

MACWORLD

again.

If you need high quality scans of 35mm slides, take a look at the revolutionary ScanMaker 1850.

The first affordable slide scanner for the serious publishing professional.

It offers 24 bit color and 8 bit gray-scale capabilities. And it's also easy to use. Just drop in a slide and you're ready to start scanning. At resolutions up to 1850 dpi.

The ScanMaker 1850 scans any 35mm slide for thousands less than other comparable slide scanners.

And best of all, it costs thousands less than other comparably equipped slide scanners. Which explains why the ScanMaker 1850 is the logical choice for 35mm slide scanning.

ScanMaker 600Z (PC)	*$1,995*
ScanMaker 600ZS (Mac)	*$2,195*
ScanMaker 1850 (PC)	*$2,995*
ScanMaker 1850S (Mac)	*$3,195*

If all this weren't enough, both ScanMaker models include the latest image processing software. Enhance, refine and separate your images with the full version of Adobe Photoshop for the Macintosh or PhotoStyler from U-Lead Systems for Windows 3.0.

So, whether you're working in black and white or color, with photographs or 35mm slides, get a ScanMaker scanner from Microtek. We won't be content until you're satisfied.

For information or the name of your nearest dealer, call us at 800-654-4160 or in California, call 213-321-2121.

MICROTEK
Better Images Through Innovation.

• Microtek Lab, Inc., 680 Knox Street, Torrance, CA 90502, (213) 321-2121, (800) 654-4160 • Microtek International, Inc., No. 6, Industry East Road 3, Science-Based Industrial Park, Hsinchu, Taiwan, 30077, R.O.C., 886-35-772155 • Microtek Electronics Europe, GmbH., Schiess-Straße 72, D-4000 Düsseldorf 11, F.R. Germany, 49-211-526070

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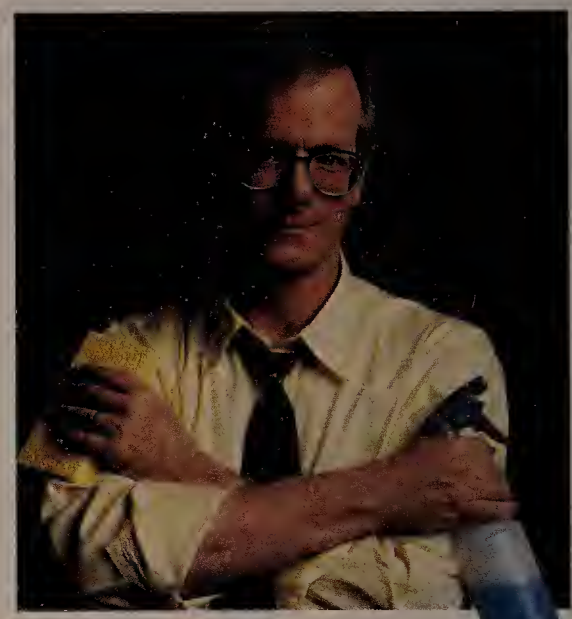
INTRODUCING THE BEST THING THAT EVER HAPPENED TO WINDOWS.

The Norton Desktop integrates a file manager and program manager into one seamless desktop.



Peter Norton

THE NORTON DESKTOP™ FOR WINDOWS.™

Now you can make Windows perform the way you've always wanted—without changing the way you use it. Because The Norton Desktop is the perfect companion for Windows.

For starters, you can move your programs and file groups from the confinement of the Windows Program Manager to the freedom of The Norton Desktop. It's like having your file manager and program manager transparently integrated—all for just $149*!

The Norton Desktop's enhanced file manager allows you to launch, copy, move, view and delete a file or application by clicking and dragging icons on the desktop. You can also print documents by dragging files to any printer icon. In fact, our icon editor makes it easy to select any of the more than 150 icons provided, while The Norton Viewer enables you to instantly view files from over 30 Windows and DOS applications.

"We took one look at The Norton Desktop for Windows, and it instantly became the way we'll compute in Windows from now on."

—PC Computing, August '91

Norton Backup

Not only does the Norton Desktop make sure your files are well managed, it also ensures they're well protected.

We've included The Norton Backup™ for Windows,** one of the fastest, most reliable backups you can buy. You can easily set-up automatic backups for any time of the day or night, whether you're present or not, and backup in the background, even to and from network drives.

And The Norton Desktop provides the easiest UnErase™ ever, for stand-alone PCs and network systems, plus the industry's most powerful automatic disk diagnosis.

UnErase

It also includes a rich assortment of screen savers, along with our SuperFind™ text searching, enabling you to quickly search and find files on any disk drive—even on networks.

So if you're ready to improve your Windows, visit your nearest dealer or call **1-800-343-4714, Ext. 722W** for more information about the Norton Desktop. It could be the best thing that ever happened to your PC.

SYMANTEC.™

*Suggested retail price, USA only. **Also available separately for $129 (MSRP). © 1991 Symantec Corporation. All rights reserved. The Norton Desktop for Windows is a trademark of Symantec Corporation. All other brand or product names mentioned are trademarks of their respective holders.

Circle 266 on reader service card

CONSUMER WATCH

Advice and information for the computer consumer

Christine Whyte

When Is Overnight Service Really Overnight?

I recently ordered a 386/25 from Gateway 2000. An important consideration was service: In their monthly ads in *PC World*, Gateway claims, "Replacement parts sent via overnight shipping free of charge." However, when the power supply in my two-week-old computer began smoking and died, Gateway's technical support personnel told me I'd have to wait "four working days...what with the paperwork and all." Since my power supply quit on a Thursday, I thought I'd be lucky to get the replacement part by the following Wednesday. Had I known that Gateway's "overnight shipping" really meant four days, I'd have bought from a local retailer with on-site service. I simply can't afford to be out of commission for that long.

George N. Couch
Mt. Horeb, Wisconsin

Gateway 2000 responds: Our ads do indeed state overnight shipping of replacement parts. Unfortunately, this is not always possible. Various factors play into our delivery time such as the time of day a customer calls, whether the part ordered is in stock, and the limits placed on us by our shipping carriers. We also send every part to our testing department before shipping it. We always inform customers about any delays. Mr. Couch's situation was our fault, and we apologize. However, the majority of our customers do receive replacement parts overnight. One problem seems to be the wording of our ad, which we have reworked once already because we have no intention of misleading anyone. Our policy does not actually guarantee overnight *receipt* of replacement parts, but once parts are available and tested, they are always shipped overnight free of charge as our ad states. We maintain customer satisfaction as our highest priority, so we'll take another look at our ad copy to see how we can make our policies as clear as possible.

Mike Schmith
Customer Satisfaction Coordinator

Clone Buyers: Check Out Windows 3.0 Compatibility

I've been having great difficulty using *Windows 3.0* and *Windows* applications on my Packard Bell PB1000. Seemingly random Unrecoverable Application Errors occur and lead to a variety of errors and system shutdowns. I've spent countless hours on the phone with Microsoft and Packard Bell; each seems to point a finger in the other's direction. On Microsoft's advice, I upgraded my BIOS chips and also tried many other suggestions, such as expanding my environment size, but nothing seems to help. Microsoft informs me that Packard Bell has tested my computer with *Windows 3.0* and that it's compatible. Packard Bell also insists their PB1000s are *Windows 3.0*–compatible. When I first spoke to Packard Bell, they assured me my problem would be solved. But after I had several conversations with the technical support staff, the support supervisor called and told me they had taken the matter as far as it could go. I offered to pay the shipping charges to send my system if they would ship back a replacement PB1000 or any part deemed responsible for my disruption. I was told to write customer service with this offer and did so, but have yet to receive a reply. Until I encountered this quagmire, I would have recommended a clone, and a Packard Bell for that matter, to anyone. It was a good system and had performed flawlessly.

Jeffrey S. Hoersch
Pewaukee, Wisconsin

Microsoft responds: The problem Mr. Hoersch experienced is a known incompatibility between Packard Bell's PB1000 model and *Microsoft Windows* version 3.0. Clearly, Microsoft apologizes for Mr. Hoersch's frustration. We have worked with Packard Bell technical support to devise the following solution: Add a **PadCodeSegments=1** line in the STANDARD section of the *Windows 3.0* SYSTEM.INI file. This line isn't guaranteed to solve all problems, but it should reduce their occurrence. The Packard Bell PB1000 is not listed as a supported machine on the *Windows* Hardware Compatibility List, which denotes all personal computers certified by Microsoft to run *Windows 3.0*. This list is available as part of the *Windows 3.0* retail package or can be ordered from Microsoft Sales and Support at 800/426-9400. We strongly urge customers who are considering installing *Win-*

(continues)

ANTHONY RUSSO

AccountMate.

Great Out-of-the-Box, Yet Won't Box You In.

Ready to Use, Ready to Change
AccountMate accounting software is so comprehensive and easy to use, you can start processing accounts receivable, generating reports, or managing inventory the very day you install it. Depending on your needs, you can buy one or all of AccountMate's modules, including General Ledger, Accounts Receivable and Payroll.

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With modifiable AccountMate, you can:

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*AccountMate is available in MS DOS, LAN, and single or multi-user formats.

Circle 258 on reader service card

dows 3.0 to review that list and to contact the PC manufacturer or Microsoft Product Support with any questions. Finally, we are happy to hear that Packard Bell has offered Mr. Hoersch a hardware upgrade as an additional solution to his problems.

Rich Abel
Windows Group Product Manager

Editor's note: Packard Bell offered Mr. Hoersch the option to upgrade to a 286 or 386SX machine for a nominal fee. He chose the latter model. The upgrade includes a full one-year warranty and six months of free on-site service.

Service With a Smile

I traded in my Hewlett-Packard LaserJet IIP for a IIIP, which worked great until I tried to install my Pacific Data Products Pacific 4 memory board. I was upset to learn that the board doesn't work with the IIIP, only with the IIP, and that it would cost me $132 to obtain an HP memory-board upgrade. When I called Pacific Data about my problem, a representative calmed me down and told me Pacific would send a new board free of charge. She instructed me to return the old board when I received the new one. This is the kind of service that people write letters to their favorite magazine about.

Robert W. Byrd
Milverton, Ontario, Canada

Watch Out for Limited Shelf Life

I purchased Willow Peripherals' Publishers' GS video capture board to incorporate video images into my desktop published documents, and I have been sorry ever since. The capture board was delivered with obsolete software that wouldn't work with my ATI VGA Wonder+ board. After I faxed Willow a copy of my registration card, it took them more than a week to send the current software, which arrived with no documentation. When I called technical support for help, I was put on hold for 30 minutes. Next, I wrote a letter to technical support; after receiving no re-

BUG WATCH

Up-to-date information about hardware and software bugs

Microsoft DOS 5.0

If you're having problems using DOS 5.0 to swap applications, Microsoft may have a fix for you. The MS-DOS 5 Task Swapper executable file—in both the MS-DOS 5 Upgrade products—contains a bug that will crash your system if a swapping session swaps or attempts to swap two applications that are each using expanded memory. Microsoft plans a remedy in October with a revision of the Task Swapper executable file. You can get it by calling Microsoft Product Support Services.

Microsoft Corp.
800/426-9400

PC Tools 7.0

Starting *PC Tools 7.0* under DOS 5.0, users may find the system hangs and presents a blank screen. A Central Point Software representative says this is caused by the compression utility included in version 7.0; you can fix it with LOADFIX, a DOS 5.0 utility, or *Lowfix*, a shareware utility found on most BBS's. To use LOADFIX, type **LOADFIX**, a space, and the *PC Tools 7.0* application you would like to open, such as **SI** (System Information). You must use LOADFIX every time you open a *PC Tools* application, whereas *Lowfix* bypasses *PC Tools'* compression utility algorithm, so users need run *Lowfix* only once on each *PC Tools* application.

Although *PC Tools 7.0* is a text-based program, Central Point Software has included a mouse pointer. If users have a super-VGA card or a PS/2 Model 70, the mouse pointer may jump on screen or leave a trail. To fix this, disable the mouse by typing **/NGM** in the command line or by running *PC Config* from *PC Tools 7.0's* central menu and selecting the option to disable the mouse pointer.

Central Point Software expects to have ready a maintenance release containing other bug fixes for *PC Tools 7.0* by the time you read this; the company will send this release to all registered users.

Central Point Software
800/888-8199, 503/690-8090

Have you run into a software bug or hardware incompatibility? Call us at 415/978-3253 with the details. We'll investigate problems and report on those with the broadest interest.
—Susan Lusty

Lower your budget not your expectations.

Before you run out and spend four or five thousand dollars for a 386SX notebook PC, we seriously suggest you take a close look at Samsung.

We designed our NoteMaster™ 386S/16 to have the performance features most people need at a substantially lower price than the Compaq LTE 386/20.

NoteMaster has a better screen, a more responsive keyboard and can be upgraded with a coprocessor, modem or more memory without even opening up the case. It's also slimmer and lighter than Compaq. And it comes with our toll-free customer service hotline so you get answers directly from our product experts. As one of the world's largest manufacturers, we make most of our own components, so you realize considerable savings with superior quality control.

Call 1-800-624-8999, extension 85 for more information or the name of your nearest dealer.

You'll discover you can own the best without paying the most.

	Samsung NoteMaster 386S/16	*Compaq LTE 386/20*
Processor	*16MHz 386SX*	*20MHz 386SX*
Dimensions	*8.5" x 11" x 2.1"* *7 lbs.*	*8.5" x 11" x 2.2"* *7.5 lbs.*
Display	*VGA Sidelit CCFT* *Paper White VGA LCD* *256KB Video RAM* *64 grey shades support*	*VGA Edgelit LCD* *16 grey shades support*
Keyboard	*Standard AT-compatible* *3mm key travel depth*	*Enhanced keyboard* *2.5mm key travel depth*
Memory	*1MB expandable to 5MB*	*2 MB expandable to 10MB*
Software Incl.	*Laplink III* *MS-DOS* *Windows 3.0*	*Not included*
Support	*Toll-free 800 number* *On-line modem support*	*Toll-free 800 number*
Price	*20MB - $2799* *40MB - $3099*	*30MB - $4399* *60MB - $4999*

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Technology that works for life.

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Las Vegas, Nevada

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Circle 265 on reader service card

When Users Talk About Improved Graphics For Advanced Windows Applications...

"More graphics real estate is critical with my advanced applications."

"The choice of small or large system fonts is a fantastic feature."

"A coprocessor board improves the performance of my system...extends its useful life."

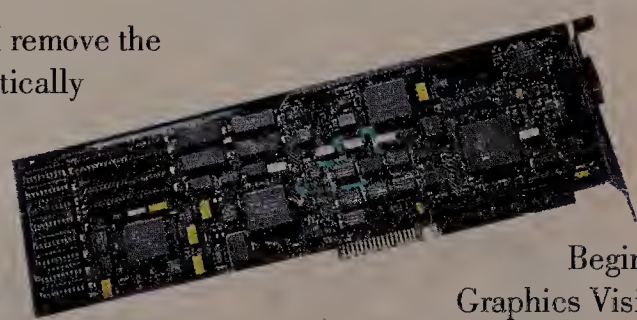
"I need a board that not only meets today's demands, but takes me into the future."

"Even if VGA is enough now...a graphics coprocessor is the way to go in the near future."

...they are talking about the Graphics Vision™ 1024.

The Graphics Vision 1024 was designed to make your 256 color applications fly.

Its built-in coprocessor and video RAM remove the graphics burden from your CPU, dramatically improving both system speed and graphics performance. In fact, the slower your system, the more it will benefit from the Graphics Vision 1024. Supporting resolutions up to 1024x768 non-interlaced for popular graphical user interfaces, applications and monitors, the Graphics Vision 1024 is everything you need for superior graphics.



Graphics Vision 1024 features Windows-optimized drivers, the most important factor driving video performance for advanced Windows applications.

At 1024x768 the Graphics Vision provides 2½ times the graphics workspace of standard VGA and more than twice the performance of non-coprocessed Super VGA running Windows in 256 colors.

Beginning at just $695 suggested retail price, the Graphics Vision 1024 offers the best performance for the price in graphics controllers.

For product or ordering information call us at

1-800-422-7369

APPIAN

Graphics Vision is a trademark of Appian Technology Inc.

The New Vision in System Solutions

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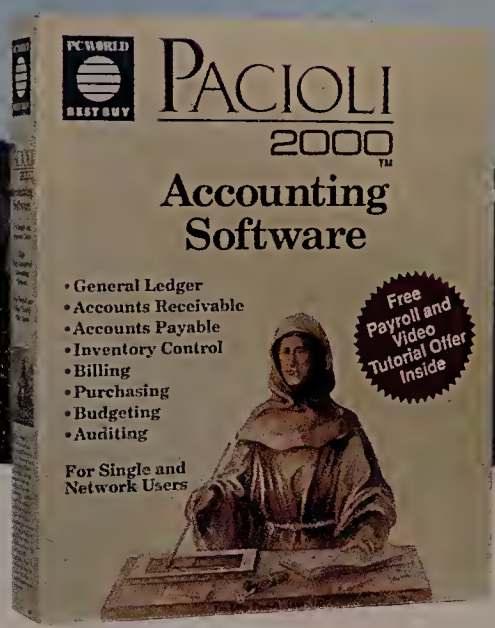
"Pacioli 2000 gives us everything we need"

$49.95



Like more than 100,000 other satisfied customers, Linda and her boss Roger have discovered the many benefits of using our award winning Pacioli 2000 Accounting Software. "It really is easy to use and the customer service is tremendous," says Linda. Roger likes Pacioli 2000 because ". . .it offers everything we need and the cost was hard to believe." In fact, the *New York Times* states that Pacioli 2000 is ". . .the equal of other high end accounting programs in every way but cost."

Pacioli 2000 has been featured on *CNN's Headline News* and *Money Line*. It has also been honored by *PC World* as the "Best Buy" in 1990 and has received *Compute's* CHOICE AWARD for the "Best Financial Software of 1991." This system was designed by J. M. Hurtado, who started the accounting software revolution with DacEasy™ Accounting in 1985. Pacioli 2000 makes managing your business finances easier than you ever thought possible by fully integrating eight modules into one powerful system: General Ledger, Accounts Receivable, Accounts Payable, Inventory Control, Billing, Purchasing, Budgeting and Auditing.

It includes pull-down menus, full mouse support, context-sensitive help, automatic installation, and a file inquiry system that will let you make inquiries or create accounts "on-the-fly" . . .features not usually found in the most expensive accounting packages.

PC Week called Pacioli 2000 ". . .the best software value of the year" and they are right. Pacioli 2000 is also fully networkable, which means one or any number of users can enjoy the same easy-to-use, powerful features with no additional fees. It is ready to perform as multi-user accounting software with file and record locking, multi-level password protection and more.

In addition to being easy to use, Pacioli 2000 is backed by a 90 day money-back guarantee when purchased directly from M-USA. If you are not completely satisfied, simply return the entire package and we will refund your purchase price (less shipping charges). You will also receive FREE technical support for 30 days. If you have any questions while using Pacioli 2000, the answers are as close as your telephone.

And now, there are two great offers included. When you send in your registration card, you can order our new Pacioli 2000 Payroll FREE. You can also order a FREE 2 hour instructional video to help you learn MS-DOS, Basic Accounting and Pacioli 2000. With each offer you pay only for shipping and handling.

The *Computer Buyer's Guide and Handbook* said in the January 1991 issue, ". . Pacioli is one of the all-time great bargains in software." Because it gives them everything they need, Linda and Roger agree. Try it and you'll soon discover that Pacioli 2000 will meet your needs too.

Minimum Hardware Requirements: IBM or compatible computer with 500Kb of free memory available, hard disk, monochrome or color monitor, mouse optional, MS-DOS 2.1 or later for single users (3.1 or later for networks), 132 column dot matrix printer in compressed mode.

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All specifications and special offers subject to change without notice.

8 Modules Fully Integrated into One System
•
Easy to Install, Learn and Use
•
Network-Ready with No Additional Fees
•
30 Day Free Technical Support
•
90 Day Money-Back Guarantee
•
Offer for Free Pacioli 2000 Payroll
•
Offer for Free Instructional Video

M·USA
BUSINESS SYSTEMS, INC.
15806 Midway Road
Dallas, Texas 75244-2195

$49.95 *suggested retail USA, plus $7.50 shipping and handling plus 8.25% sales tax for Texas residents.*

For more information call
1-214-490-0100
To order in USA call
1-800-345-4243, Operator 256

NEW!

Special Canadian Version of Pacioli 2000 Accounting Software, supporting GST and PST is now available.

$99.95 *Canadian dollars suggested retail (plus freight)*

To order Canadian Version, call
1-800-668-0454, Operator 2560.
Free offers not available in Canada

Circle 7 on reader service card

Hassle-Free Printer Sharing

for the HP LaserJet II, IID, III and IIID

PC MAGAZINE

"The ServerJet is the smoothest and most practical way I know to share a LaserJet." Frank J. Derfler, Editor PC Magazine, 1/15/91

Here's how you and your co-workers can have your own HP LaserJets without breaking the corporate budget.

It's called **SimpLAN** *ServerJet*.

Simply plug the *ServerJet* into the 'Optional I/O' slot of your HP LaserJet. Stretch phone cable, up to hundreds of feet, to each computer. Then, 12 people can simultaneously *whooosshh* documents to the LaserJet at speeds as fast as 115,200 baud.

No more wandering down the hall with floppy in hand.

Or borrowing someone else's LaserJet.

Or wasting time waiting to print.

The *ServerJet* is available in a variety of models with up to 4MB of buffer memory. And because your office may have printers other than HP LaserJets, ASP Computer Products offers a complete line of printer sharing solutions.

To order your *ServerJet* or for more information call ASP at:

800-445-6190

ASP COMPUTER PRODUCTS, INC.

160 San Gabriel Drive
Sunnyvale, California 94086
Phone: 408-746-2965 • Fax: 408-746-2803

SimpLAN & ServerJet are trademarks of ASP Computer Products, Inc. / HP LaserJet is a registered trademark of Hewlett-Packard Co.

Circle 43 on reader service card

sponse, I sent a letter to the company president, but a month has gone by with no reply.

Roy Di Bias
Burbank, California

Willow Peripherals responds: First of all, let me apologize for the unwarranted aggravation that Mr. Di Bias has suffered in his dealings with us. We have set into motion several programs to prevent a recurrence of the type of problems he encountered. Second, we're shipping a brand new Publishers' GS to him. We checked the board he returned to us and found several problems that had been addressed in subsequent engi-

(continues)

POWER TIP NO. 214

Clean Out WordStar BAK Files

WordStar generates BAK files by default every time you save. These backup files can be useful, as they provide a noneditable copy of the last-saved version. But they also make it hard to scan your directory, and they take up a lot of disk space. You may want to set up a Shorthand macro that works with 4.0 and later versions to erase all BAK files with two keystrokes. Launch *WordStar* and press <Esc>?. Press e to assign the macro to e or select another key if e is already in use. At the Description prompt, enter <Erase all BAK files>, type y *.bak into the Definition box, and press <Ctrl>-P<Ctrl>-M<Enter><Enter>y. Now when you want to clean out your BAK files, press <Esc>e at the Opening Menu.

Rex Farrance
Assistant Editor

SOME OF THE MOST CRITICAL INFORMATION YOU NEED IS SITTING RIGHT UNDER YOUR NOSE.

NOW LIGHTSHIP PUTS IT RIGHT BEFORE YOUR EYES.

Tired of searching through reports, budgets, industry publications and other sources for the information you need to do your job?

Well, now you don't have to.

Pilot Executive Software's LightShip™ brings all the critical information you need directly to your PC - - - in a colorful, graphic format that combines text, numbers, graphics and even photo-quality images all on the same screen. So you get the whole story all at once. And you can drill down for more information as you need it.

With LightShip, you have access to real-time information from any source available over a network or modem . . . PC spreadsheets, word processors, databases, file servers, and even mainframes. LightShip works with Windows 3.0, and is extremely simple to use and program according to your needs. All you do is point and click.

To find out more about LightShip, call 1-800-944-0094. And stop working so hard to get the information you need.

LIGHTSHIP

Pilot Executive Software LightShip Division,
40 Broad Street, Boston, MA 02109.

PILOT
EXECUTIVE SOFTWARE

Circle 216 on reader service card

neering upgrades. Mr. Di Bias's unit had been sitting on the dealer's shelf for at least five months after we started shipping an updated product. We have a policy of offering our dealers a program to update boards, but apparently it wasn't effective in this case. The software that is now shipping is unfortunately still not 100 percent complete, but we will distribute new software with documentation in the near future. We will also send Mr. Di Bias a check to cover the phone expenses he incurred when he called us for help.

Howard Alexander
Vice President, Marketing Relations

Editor's note: Steve Taylor, a spokesperson for ComputerLand, offers advice on how to make sure the products you purchase from a dealer are current. First, ask the salesperson if what you're buying is the latest version. If a product is being sold at a bargain price, be suspicious that it may have been discontinued. If you want to double-check, call the manufacturer to find out what the latest version is and what its packaging looks like, then compare that with the product you're buying.

Going the Extra Mile

I want to express my appreciation to Borland for their service when I upgraded to *Quattro Pro 3.0*. While installing my upgrade, I discovered that the fourth disk in the set was damaged. After I contacted Borland through their CompuServe forum, they shipped me a complete set of new disks at no charge via Federal Express—without my requesting express delivery.

Ted Neff
Nichols, Iowa

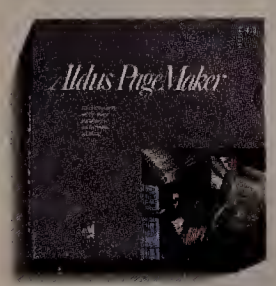
Overseas Customers—Be Careful Where You Buy Software

In May 1990, I purchased *OmniPage 2.1* from PC Connection in New Hampshire, and in October 1990 I purchased *OmniSpell*, which included the upgrade *OmniPage 2.11*, directly from Caere Corporation. Now I would like to upgrade to the *Windows 3.0* version of *OmniPage*. This past April I wrote to Caere, whose German representative then called to say I should get the upgrade from the dealer where I bought the program because he didn't handle upgrades for the U.S. version. When I wrote to PC Connection to request the upgrade, they said they didn't handle Caere upgrades. I wrote again to Caere asking for a solution but didn't get an answer. I paid $750 for the software because I wanted legal ownership and the possibility of the *Windows 3.0* version. Now I ask myself if piracy isn't the less frustrating way of obtaining software.

Rudolf Bleier
Remmingsheim, Germany

Caere responds: A brief description of our distribution program will shed

You could be a genius and do this on a word processor.

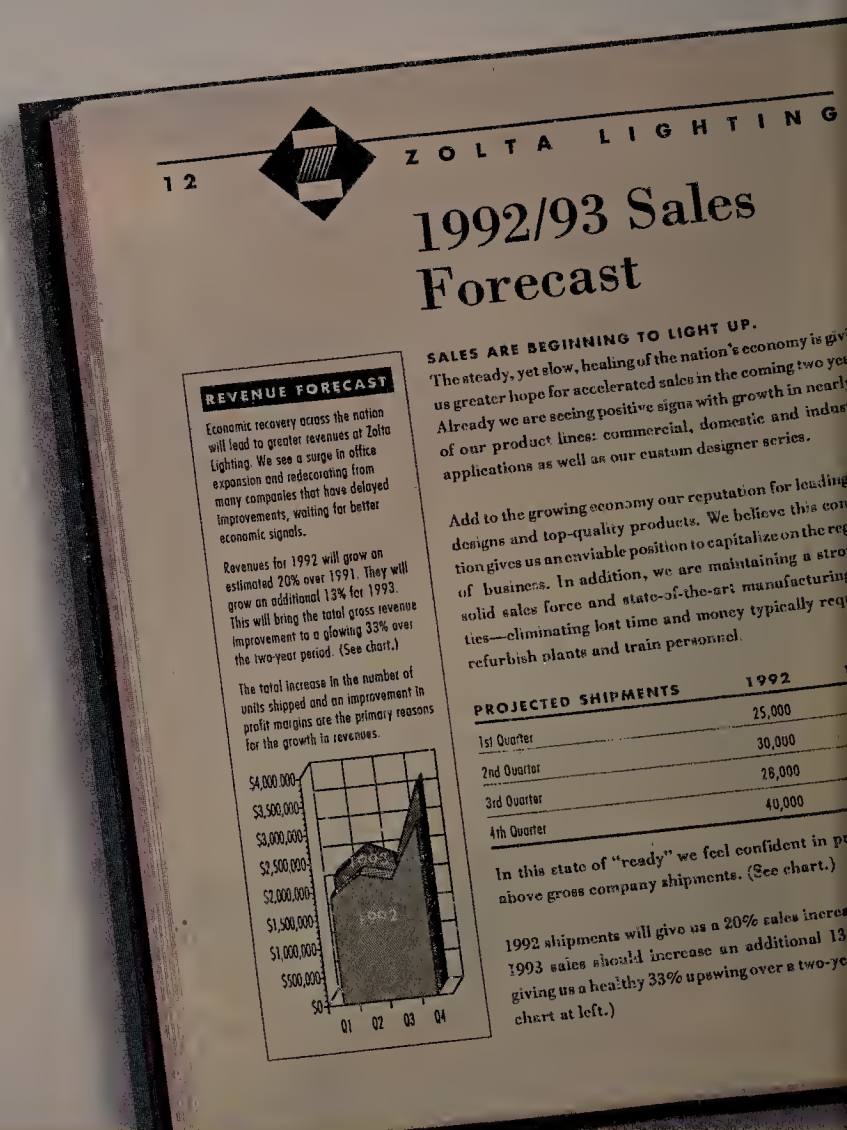


Layout and design software for the PC and Macintosh.

It'll take more than brains to create this on your word processor. It'll take some old-fashioned cutting and pasting. And it won't look nearly as good.

On the other hand, you could do the smart thing and create it on Aldus PageMaker® 4.0 for Windows. In the process, you'll save yourself a great deal of frustration, and plenty of your precious time.

You see, PageMaker has many capabilities not found in a word processor. All of which makes creating reports, proposals, brochures, catalogs, or manuals quick and easy. Not to mention eye-catching.



Quote reprinted from *PC Computing*, March 1991. Copyright ©1991 Ziff Communications Company. This ad was created with Aldus PageMaker. Aldus, the Aldus logo, and PageMaker

some light on Mr. Bleier's predicament. Although Mr. Bleier purchased *OmniPage 2.1* from PC Connection in New Hampshire, currently Caere's U.S. resellers are *not* authorized to sell our products outside the U.S. Nonetheless, software is frequently sold to other regions of the world, intentionally or otherwise. Furthermore, our German distributor is authorized to support and upgrade *only* German versions of *OmniPage*. Mr. Bleier has thus purchased a product that Caere never intended to sell in Germany, and that our German distributors were never authorized to sell or support. Fortunately for Mr. Bleier, he purchased *OmniPage 2.11* in October, concurrent with Caere's introduction of *OmniPage 3.0*. All customers who purchased version 2.11 after October 1 are entitled to a free upgrade. Because he had such difficulty obtaining an upgrade, we have sent Mr. Bleier a free copy of *OmniPage Professional* rather than version 3.0, a $995 value that includes several features not provided in our base product.

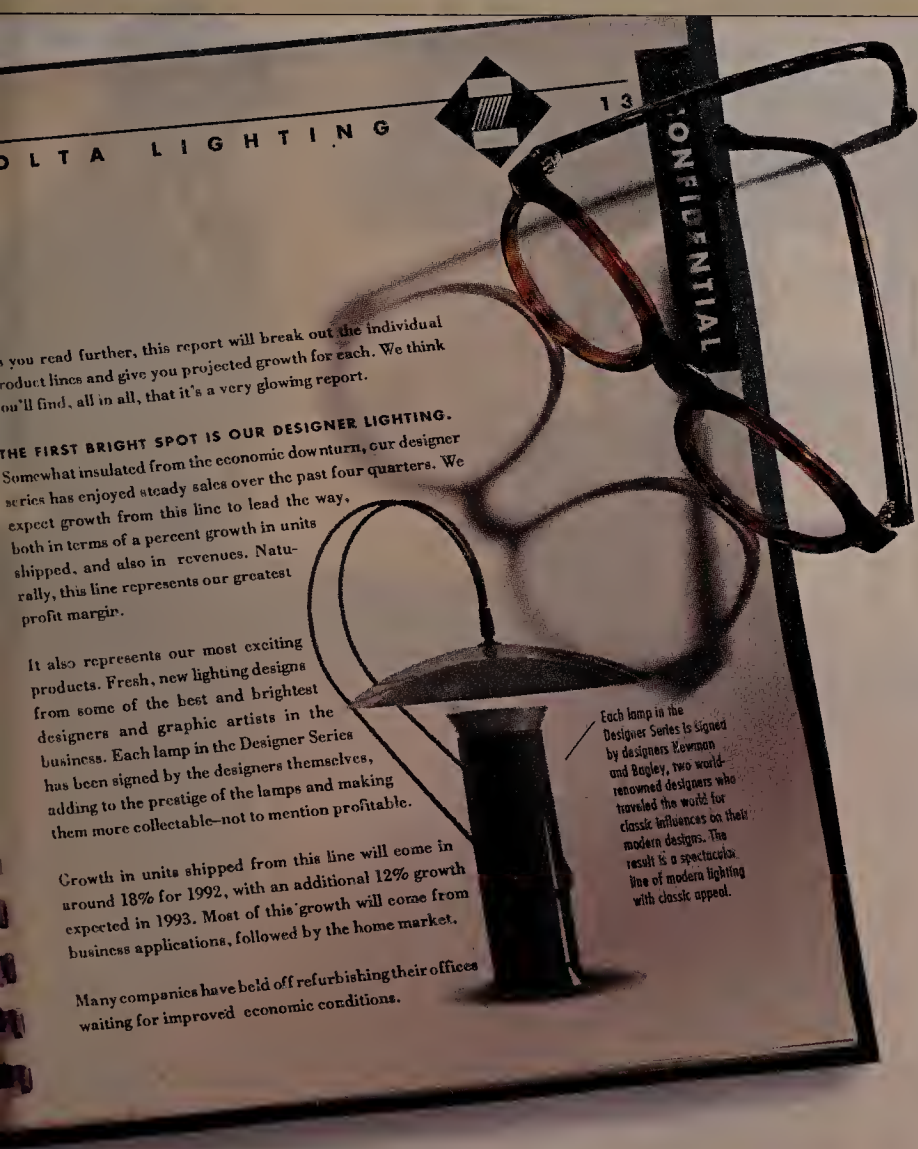
Vallance Cole
Product Marketing Manager

Editor's note: Matt Miller, worldwide distribution manager for Caere, explains that the U.S. and overseas versions of the company's PC products are different; those sold in the United States aren't copy protected, while the overseas versions are (most countries in Europe and the Far East don't have copy protection laws). To make sure customers get the proper upgrades, Caere has authorized one distributor per country to handle them. Miller's advice to overseas customers is to buy only from the retail outlet in their country—that will ensure they get the correct version for their market and proper support on upgrades. If you want to pay less and purchase via mail order, you run the risk of ending up in Mr. Bleier's predicament.

Unusual Warranty

Setting a new warranty standard for 5¼-inch and 3½-inch disk drives, Micropolis Corporation of Chatsworth, California, announced a five-year warranty on all its disk drives sold through authorized distributors and resellers. The five-year replacement warranty applies to products sold since January 1, 1991, and replaces all previous warranties. The new warranty covers all Micropolis 5¼-inch disk drives of 380MB and above as well as the Over One Gigabyte 3½-inch drive and associated product line.

Think you've gotten a raw deal—or a great one? Send the details to Consumer Watch, *PC World, 501 Second St. #600, San Francisco, CA 94107; MCI Mail PC World Editorial; CompuServe 74055,412; or 415/442-1891 (fax). We'll investigate complaints and publish letters with the broadest interest.*



Or use PageMaker for Windows and just look like one.

Special features pull together multiple files of text, graphics, spreadsheets, tables, or databases. PageMaker's precision layout and typographic tools then effortlessly give them a professional polish. In fact, to quote the March 1991 issue of *PC Computing*, "PageMaker 4.0 proves you don't have to sacrifice ease of use for sophisticated, professional page-makeup abilities."

To find out more about the benefits of desktop publishing, call 1-800-685-3508 for a free booklet. Then get ready to show everyone your true brilliance.

The Creative Edge in Business.

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THE POWER THAT MOVES YOU...

ZENITH DATA SYSTEMS UPSETS THE BALANCE

MastersPort 386SL
The fully-featured notebook that sets the standard for the Intel386™ SL microprocessor. Its *Premier System Management*—with two separate resume modes—lets you hold work in active memory for weeks at a time.

INTRODUCING 5 NEW PORTABLES FROM ZENITH DATA SYSTEMS.

The conventional way to look at portable power is from the PC's perspective. The processor. The speed. The memory.

At Zenith Data Systems, we believe the proper perspective is yours. How easily you can take full advantage of the power within your PC. A philosophy exemplified by our five new portables.

Our breakthrough MastersPort 386SL. The first notebook you can use, and use, and use, without ever thinking about battery life.

Our SupersPort battery-powered i486™ laptops — the first ever. Both so advanced, they just might replace your desktop.

Plus 286 and 386SX notebooks that are titans on performance.

So if you want power without limits, these are the portables to move to. Unquestionably from Zenith Data Systems.

For more information and the name of your nearest Zenith Data Systems Medallion Reseller, call **1-800-523-9393** in North America.

OF POWER.

MastersPort 286

MastersPort 386SX

SupersPort 486SX

SupersPort 486

LOOK INTO THE POWER OF 5 NEW PORTABLES

	MastersPort™ 286	MastersPort 386SX	MastersPort 386SL	SupersPort™ 486SX	SupersPort 486
Processor – Speed	286 – 12/6MHz	386SX – 20/10MHz	386SL – 20/5/0MHz	486SX – 20/10MHz	486 – 25/12.5MHz
Co-Processor	80C287 socket	80387SX socket	80387SX socket	Upgradeable to 486-20MHz	Integrated
Memory (Std./Max.)	1MB/2MB	2MB/4MB	2MB/8MB (64K cache)	4MB/16MB	4MB/16MB
Hard Disk Drive	30MB	60MB	60MB	120MB	120MB
LCD/Size	Backlit/8.85"	Backlit/8.85"	Backlit/8.85"	Edgelit/10.7"	Edgelit/10.7"
Video/Gray Scales	VGA/16	VGA/16	VGA/32	VGA/64	VGA/64
Power Management	• Suspend/Resume • Sleep mode • Low battery operation	• Suspend/Resume • Sleep mode • Low battery operation	*Premier System Management*™ • Standby/Resume • Rest/Resume • Panic Save • Unattended communications	*Intelligent Power Management*™	*Intelligent Power Management*
Software	MS-DOS® included	MS-DOS included	MS-DOS pre-installed, Microsoft® *Windows*™ v. 3.0 included	MS-DOS and Microsoft *Windows* v. 3.0 pre-installed	MS-DOS and Microsoft *Windows* v. 3.0 pre-installed
Weight (with battery)	6.6 lbs.	6.6 lbs.	6.8 lbs.	15 lbs.	15 lbs.

ZENITH data systems

Groupe Bull

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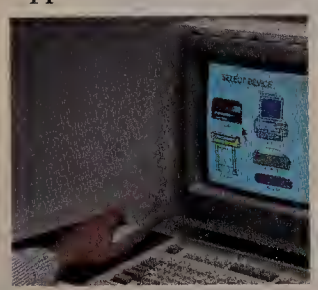
Circle 290 on reader service card

LASERNET®

The Sharing Family With Peripheral Vision

Only Western Telematic's LASERNET sharing devices have true peripheral vision — the widest family of products to meet the needs of today's data sharing requirements. Whether it's a simple sharing set-up or a complex network — LASERNET has a device to fit your need and budget.

Western Telematic has peripheral vision in support software too! LASERNET provides easy-to-use device-select software operable with both Windows™ or MS-DOS® applications.



You won't need glasses to see that LASERNET offers the widest selection and best value for your money. Just take a close look at these LASERNET models and see which one fits your application:

HIGH-LEVEL

Multi-Link™

Serial/parallel device for twelve or more users. Expandable, through dedicated high-speed link, up to 384 any-to-any, user-selctable ports, over 4000 feet. Perform printer/plotter sharing, modem/FAX sharing, PC-to-PC file transfer and more.

- 12 concurrent high-speed ports — 8 serial, 4 parallel
- High-speed link — up to 32 Multi-Link devices — 384 total ports!
- Dynamically allocated, field-expandable SIMM memory — 256 KB to 4 MB
- RJ-11 serial ports for snap-in cabling
- Any-port-to-any-port connectivity
- Any-port designation for printer or plotter
- Each port individually programmable
- Windows or DOS pop-up menu software for instant device selection and status
- Uses standard parallel PC-to-printer cables

12 any-to-any ports; buffered from 256 KB to 4 MB ..... start at $795

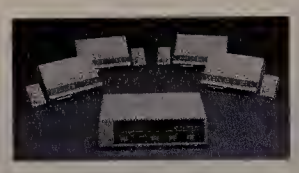
GENERAL

PSU-82C/SP

Programmable sharing units for both serial/parallel printers, plotters and PCs. Designed for CAD/CAE, high-level graphics, Desktop publishing or general applications.

- 4 concurrent serial and 4 parallel inputs (SP)
- 8 concurrent serial inputs (C)
- 1 serial and 1 parallel output
- Expandable buffer memory from 256 KB to 2 MB
- Separate baud rate, flow control, parity and messages for each port
- Pop-up menu software for easy printer/plotter selection
- Easy menu-driven configuration and set-up
- Prompt and response messages for plotter applications
- Support all laser printers including PostScript® printers and all types of plotters.

8 inputs; 2 outputs; buffered from 256 KB to 2 MB ..... start at $595



QwikShare® III

Low-cost, expandable, all-parallel, high-speed printer sharing system. From one to 32 PCs independently share up to three remote and one local parallel laser/dot-matrix printer or plotter.

- Expandable to 32 PCs by adding Expansion Modules
- Memory expandable up to 4 MB
- Printer Select Switch — no software or TSR program required
- All parallel port connections — PCs, printers and plotters
- Maximum network distance — 4000 feet
- Quick and easy installation using snap-in, RJ-11 cable & standard parallel cables

Printer Server; buffered from 256 KB to 4 MB ..... start at $295
Expansion Module with Printer Select Switch ..... $149 ea.

QwikShare® II

Low-cost, buffered printer sharing. Supplied with Windows and MS-DOS device-select software which provides pop-up menus for easy printer port selection.

- 6 RS-232 serial inputs - RJ-11 connectors
- 2 user-selectable laser/dot-matrix printer ports
- Expandable memory to 2MB using SIMMS
- Input speeds up to 115K baud

6 inputs; 2 outputs; buffered from 256 KB to 2 MB ..... start at $295

BASIC

QwikShare®

Complete, plug-n-go, "no-wait" sharing system. Up to six IBM PCs or compatibles can share a serial laser/dot-matrix printer or plotter. Each system contains: sharing unit; super-fast spooling software; three — 9- and 25-pin connectors; four —25 ft. PC cables; one —5 ft. printer cable & connector. Compatible with most popular graphics, word processing and spreadsheet software including Microsoft® Windows™.

6 inputs; 1 output; $195

LASERNET products are **made in U.S.A.**, and backed by a **3-year** limited warranty with service and technical support. To get a closer look at LASERNET, just call on our technical sales representatives.

To order* or for More Information, Call Toll-Free

1-800-845-7226

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Making good connections.℠

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*Visa, MC Accepted; Same Day Shipping

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Circle 325 on reader service card

MANAGER'S FILE #6

Selecting Computer-Based Training

Alice LaPlante

In tough economic times, training budgets are often the first to get the ax. Despite budget constraints, your challenge as a manager is to ensure productivity by adequately training your employees on the PC software they use every day.

Using computer-based training (CBT) in the form of off-the-shelf software can be an effective way to beat the training budget blues. This software is inexpensive (typically ranging from $20 to $100), available for most business applications, and can be superior to more-expensive classroom or video-based courses.

Besides its low price, CBT's biggest advantage is that it lets trainees work at their own pace. Guiding either by text on the screen or by verbal instructions on audio cassette, CBT takes trainees through the various features of a software package while they press keys, enter data, and otherwise get the feel of a program before plunging into the actual application. The hallmark of a useful instruction program is that it includes quizzes and exercises that measure how well a trainee has mastered a particular skill or module; trainees who do poorly on such tests are encouraged to repeat the sections until they're proficient.

Most CBT packages consist of a disk containing the programmed lesson, a workbook with additional exercises, and a quick-reference guide that lists commands and keystrokes. CBT classes are available for a wide range of business applications, from introductory DOS courses costing $15 to classes on programming languages and networking protocols that cost upward of $1000. For a number of the more popular PC applications—such as *1-2-3* and *dBASE*—CBT classes are tailored to fit various skill levels.

Managers should beware, however, of CBT courses that are little more than electronic page turners. These courses simply require the user to read text on the screen and then press a key to move on to the next page of text. To be effective, CBT must be interactive and require continuous response from the user.

Programs that allow users to build customized CBT courses are becoming cheaper and easier to use. These include prototyping tools ($300–$400) that capture screens and add text, as well as complex interactive authoring tool kits ($2000–$4000).

Alice LaPlante is a freelance writer in Palo Alto, California.

Selected CBT Vendors

American Training International 12638 Beatrice St., Los Angeles, CA 90066; 800/955-5284

DSI Micro Inc. 627 Broadway, 7th floor, New York, NY 10012; 800/443-7432, 213/420-5954 (fax)

Flambeaux Software Inc. 1147 E. Broadway #56, Glendale, CA 91205; 800/833-7355

Fliptrack One-on-One Computer Training, 2055 Army Trail Rd. #100, Addison, IL 60101; 800/424-8668

Individual Software Inc. 5870 Stoneridge Drive #1, Pleasanton, CA 94588; 800/822-3522, 415/734-8337 (fax)

InfoSource Inc. 6947 University Blvd., Winter Park, FL 32792; 800/622-2995, 407/677-9226 (fax)

Intellisance Corp. 1885 Lundy Ave., San Jose, CA 95131; 800/829-1213, 408/954-8715 (fax)

When Software Is the Best Training Alternative

Computer-based training (CBT) can be an inexpensive and efficient way to help employees master PC applications—but only under the right conditions.

CBT is ideal when:

- ✓ The trainee uses standard, off-the-shelf business applications.
- ✓ Training dollars are scarce.
- ✓ Trainees with different skill levels need to learn at their own pace.
- ✓ Executives want privacy and confidentiality in learning a new application.
- ✓ Classroom or video training has provided trainees with a good background in a PC product or a good overview, but no hands-on skills.

CBT is less effective when:

- ✓ Unmotivated or computerphobic novices need special attention or hand-holding from a human instructor.
- ✓ Trainees need advanced skills specific to their job, such as sophisticated desktop publishing or graphics.
- ✓ Businesses want to implement high-end or customized products.

High-Quality Desktop Page Scanners from OBM!

TRUE 24-Bit Color and Greyscale Scanning.

THE OBM COLOR SCANNER

Gorgeous rainbow hues of color are yours with the 24-bit, true-color ProScan PS-3000. That's 16.8 million colors! Scan in a full page of colorful artwork or photos, turn around and reprint it on a color laser. You'll be asking yourself: Is it live? Or is it OBM?

This single-pass, 300 dpi scanner is perfectly matched to 300 dpi printers — same size in, same size out. For gray-scale work, switch to an impressive 256 shades of gray.

16.8 Million Colors!

The amazing OBM color scanner has just joined forces with a leader in the graphics industry — RIX Softworks — makers of ColoRIX and the new WinRIX. WinRIX is the leading Windows paint program that can scan, display, and paint images with 16.8 million colors onscreen simultaneously. Any standard VGA monitor can display this many colors, but you need a special video adaptor.

WinRIX is the first Windows scan and paint program I've seen that fully supports video adaptors all the way up to 16.8 million colors. The onscreen images are alive with vibrant, vivid colors. More colors means realistic images that look almost 3-dimensional.

And best of all, WinRIX comes free with every OBM color scanner!

SPECIAL BUNDLE

PS-3000 Scanner & WordScan OCR
Just $1,199.00

OBM PROSCAN GRAYSCALE SCANNER

Just recently released to the US market, the ProScan PS-1000 has been engineered to perform at the same speed and resolution quality as the HP ScanJet Plus for about half the price.

The PS-1000 features a state-of-the-art roll-feed system for unmatched accuracy and supports full 64-level grayscale scanning. Just slip your document into the feeder and the PS-1000 takes care of the rest. Independent lab testing saw the PS-1000 embarrass comparable scanners sporting fat price tags with its crisp 300 dpi resolution and powerful text recognition.

With OBM scanners, you get the complete system, including all required cables, interface hardware and a free copy of WinRIX, the advanced imaging software which allows fast, easy retouching, density adjustment and printing control.

SPECIAL BUNDLE

PS-1000 Scanner & WordScan OCR
Just $899.00

WordScan OCR Turns Scanned Letters, Faxes, Articles, Forms and Contracts into Useable Text!

Scanning documents using OCR (Optical Character Recognition) has helped major corporations save millions of dollars in getting information from paper onto their computers. They get contracts, faxes and reports into word processors, lists of names into a database, time sheets into the billing system, financial data directly into a spreadsheet, process medical, dental and insurance forms and more!

OBM ProDisplay HiColor VGA Adaptor

OBM brings 32,768 vivid colors to your screen for amazing and wondrous images. This is the perfect video adaptor to use with the OBM color scanner and WinRIX. Together, you'll have the finest, state-of-the-art desktop color system available. The OBM ProDisplay adaptor supports numerous applications, including Windows, AutoCAD, WordPerfect and others

OBM Our Business Machines

FULL PAGE SCANNERS

HR6540 ProScan PS-1000 Grayscale	$630.00
HR6545 ProScan PS-1000 & WordScan OCR	$899.00
HR6550 ProScan PS-3000 Color Scanner	$899.00
HR6555 ProScan PS-3000 Color Scanner & WordScan OCR	$1,199.00
HR6535 ProDisplay HiColor VGA Adaptor 5¼"	$199.00

Dear Tiger Reader:

I remember the first time I met the group from TigerSoftware. Their goal was to create an alternative software source. A source that would provide more in-depth information about the software they sold, and place a high priority on skilled customer service.

Today, TigerSoftware fills the enormous gap left by "The Incredible Shrinking Channel." TigerSoftware has become a direct channel spitfire, far and away the premier software mail-order vehicle of its kind.

In fact, TigerSoftware is a software channel unto itself.

That's why I strongly suggest you take a good look at this important industry marketing.

How to Place an Order.

- **Ordering:** Just call **1-800-88-TIGER** from 7AM to 7PM (eastern standard time) and one of our representatives will be happy to take your order. Or, simply complete the order form and return it to us — your order will be promptly processed.
- **Fax Orders:** For faster service, FAX your order form or P.O. to us on our TigerSoftware ExpressFAX Order Line — **(305) 444-5010.**
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Order Memory Direct from Tiger!

If you use a computer, you know the benefit of more memory. With a few more megabytes of memory you not only load it, you see it snap and pop onscreen with lightning speed.

Top-Quality Memory.

We're proud to present the highest quality, most reliable memory available. Offered directly from the manufacturer, 50/50 Micro Electronics, you get top quality for practically wholesale prices.

Can You Do It?

Think adding memory is over your head? It's not so hard really. Your computer manual will tell you what kind of memory chips you need. And it will even show you a picture of where to plug them in.

PCs and Macs.

For PCs and all compatibles, we offer three sizes of SIMMs, which stands for Single Inline Memory Module. A SIMM is a small board with memory chips on it. You simply plug the board inside your computer. Very easy to install. Each SIMM comes in either 256KB, 1MB, or 4MB size, to fit the right size your computer needs.

And these chips are fast! Most others sell 100ns (nano-second) chips. But our 256KB SIMM has 80ns chips, and the 1MB and 4MB SIMMs have 70ns chips. That's fast! You'll get quicker calculations and eye-popping graphics.

For the Apple Macintosh, SIMMs come in two sizes: 1MB and 4MB. With more megabytes of fast 80ns memory, your Mac will load more desktop accessories, run bigger applications, and make them all come alive with blistering speed.

Laser Printers.

Ever tried to print a full page of graphics on your stock laser printer? If so, all you ended up with is a half-drawn image. Stock laser printers just don't have enough memory to complete a full page. But the solution is simple. A memory card you slip into the side upgrades your printer for full-page graphics and all the fonts you could ever want. There are two sizes: 2MB and 4MB of memory.

50/50

MEMORY

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HR6423 1x8 80 ns SIMM Mac	$87.50
HR6424 4x8 80 ns SIMM Mac	$295.00
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HR6426 HP IIP, III, IIID 4 MB	$349.00

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JUST RELEASED — AMI PRO 2.0!

The Number-One Rated Windows Word Processor. Easier, Faster, More Creative.

Ami Pro has created a world of possibilities for the printed page. It is a pure Windows product, not a "ported" DOS counterpart. It features the visual power and easy-to-use nature of Windows 3.0 to produce top-notch results. Indeed, it established a new standard in word processing for the graphical user interface. Now, version 2.0 breaks new ground with a rich visual environment along with an amazing array of easy-to-use tools at your fingertips. You'll write and format sophisticated documents you may have never attempted before because Ami Pro 2.0 is designed to work like you do, associating pictures and symbols—with concepts. Your ideas take shape faster and expressing them becomes easier. That's the key: Ami Pro 2.0 is extremely easy to use. So easy to use in fact, that you can create crisp, professional-looking letters, reports, proposals and presentations the very first time you use it—even if you've never used a word processor before!

An Ideal Writing Environment. Fast, Smart — and Visual.

Ami Pro 2.0 features fast outlining, easy revision marking, mathematical equations and even freehand drawing. You'll put together charts and tables with simple point-and-shoot action. You'll see your work with true WYSIWYG display. You'll enjoy the built-in portfolio of style sheets and graphics-manipulation tools. Simply choose from pull-down menus to generate a table of contents, flow text around graphics, change fonts, colors and more. You'll select typefaces and move elements on the page easier than you ever thought possible. Ami Pro 2.0 gives you the best spell checker in the business, a thesaurus with 1.4 million selections, a full macro language, an interactive ruler, status bar, color palette and much more. More than Word For Windows. More than WordPerfect.

Power Under the Hood!

Although Ami Pro 2.0 is a breeze to use (and use to its fullest), it posesses enormous power under its sleek interface. You'll seamlessly import and export files from WordPerfect, Microsoft Word, MultiMate, DCA, DisplayWrite, WordStar and others. Ami Pro 2.0 contains over 120 one-click SmartIcons (which match those found in Lotus 1-2-3 for Windows) that make moving through Ami Pro 2.0 fun, and you can customize and arrange them any way you like.

Open and edit multiple documents at one time, see them in four editable view levels — all WYSIWYG and instantly "hot-link" to other Windows applications, including Lotus 1-2-3, with 2-way Dynamic Data Exchange (DDE).

Power Fields.

You can actually create documents automatically using this innovative technological feat. Power Fields are embedded commands that, typed directly into a document, enable it to perform a task automatically. For example, a business letter can request the input of a name, look up the address from another file, automatically place the name and address on the page in a pre-defined format and include various paragraphs or passages depending on the data provided. A power field could also be used to check the state or zip code in the address and determine whether a local or toll-free phone number should be included in the body of the letter.

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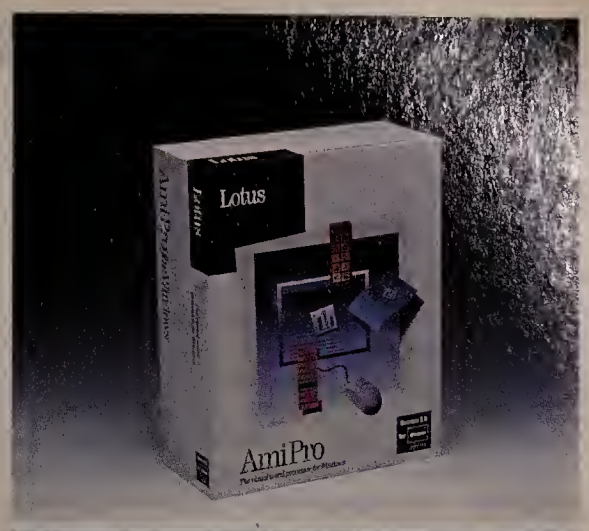

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Stunning Fonts For Your Printed Page.

Scalable Fonts from within WordPerfect, LetterPerfect, Microsoft Word and Works.

Don't just print plain text — fashion creative works of art that bond themselves to the reader. Impress upon the printed page aesthetic, stunning communications that magnetically draw readers to them. This is what professional "Desktop Publishing" is all about. This is what Publisher's Powerpak can do for your word processor.

If you use WordPerfect, LetterPerfect, Microsoft Word, or Works — you absolutely must have Freedom of Font Choice. Whether you print on a dot-matrix, inkjet or laser printer, Powerpak delivers the finest-quality fonts your money can buy.

Why Scalable?

There are two different types of font software: scalable fonts and bit-mapped fonts. Powerpak uses the newer, advanced scalable-font technology. A scalable font is basically mathematical formulas that describe the shape of the font, with no reference to the size. When you need that font, you pick a size, and the needed letters are created instantly from the mathematical formulas. The letters are created "on the fly" — as you need them. Scalable fonts use virtually no hard disk space — only 50K for an entire typeface family, which includes every size you'll ever want.

Bit-mapped fonts on the other hand, gobble megabytes of hard disk space right from the start. Bit-mapped means each "bit", or visible dot that makes up a letter, is "mapped" to a specific location. You need a separate file for each bit-mapped font — that means one file for each font size!

I used to use bit-mapped fonts (before the new scalable fonts came out). I had only 7 different typefaces. Each typeface had five sizes: 12, 14, 18, 24 and 36 point. My limited selection of fonts took up 10 megabytes of hard disk space!

Now I use Powerpak. I have over 114 different typefaces to choose from. In any size I want, from 6 to 1,000 points (Word and Works limits point size to 127). With this seemingly unlimited selection of font choices, I actually use 25% less disk space than before. If I wanted this selection with my bit-mapped fonts, I'd have to buy a 200Mb hard disk!

Quality Fonts

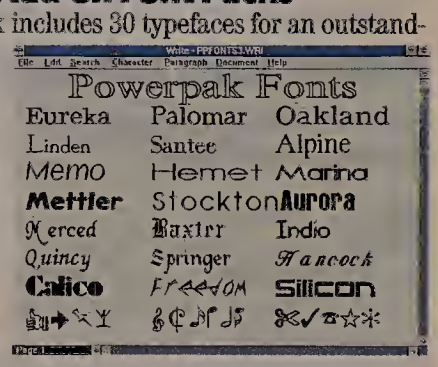
Not all fonts are created equal. There are cheapies out there that print jagged letters and have strange character-spacing. That's why you want to stay with the choice of the pros. PC World recently declared Publisher's Powerpak the "Best Buy" of font software, and gave Powerpak's printer and screen fonts the highest quality rating — Excellent.

- Picking point sizes has never been easier, 6 point to 1000 point
- Easy to install; no new commands to learn

PC WORLD BEST BUY

Add-on Font Packs

Powerpak includes 30 typefaces for an outstanding font-value. (Other font-makers charge $100 to $200 per typeface!) But that's just the beginning. There's an entire library of over 800 typefaces available for you to choose from. Nine foreign languages from Greek to Hebrew to Korean. Atech Font Packs: 117 different volumes — each filled with beautiful assortments of typefaces — and only $29.95 per package.



Super Font Pack FREE with Publisher's Powerpak!

$150.00 value — FREE! 114 typefaces, each in normal, bold, italic, bold italic, thin, condensed, wide, expanded, and hollow.

Powerpak

HR4095-5 Powerpak w/FREE Font Pack 5¼" . . $59.95
HR4095-3 Powerpak w/FREE Font Pack 3½" . . $59.95
Powerpak for Windows just $19.95 with any order over $100.00

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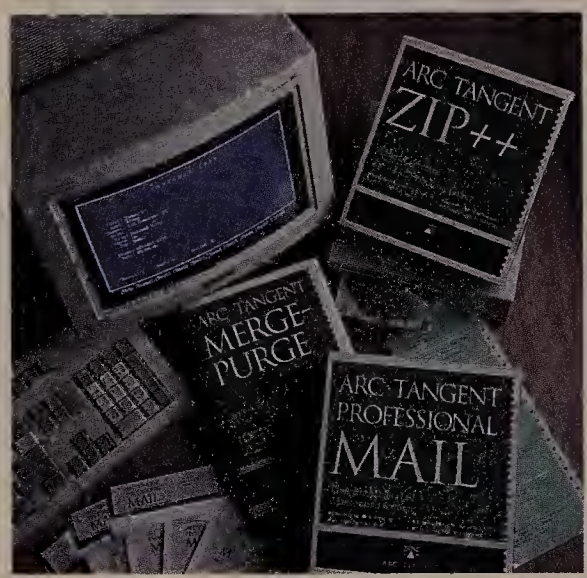
From 29 Cents to 7.4 Cents For A One-Ounce Letter!

Certified by the U.S. Post Office

Professional Mailing to the masses — that's the theory behind Arc Tangent's decision to lower their price from thousands (and requiring special hardware) to hundreds (and run on any PC).

The Cadillac of mailing list software, this is the most advanced, professional-level package available on any PC. Certified by the U.S. Postal Service, you get a highly compressed version of the 3.2 gigabyte U.S. Post Office file on a single CD!

Eradicate bad addresses by checking your list against every valid address in the United States. Put advanced, professional-level features on your desktop that before were only available to huge mailing houses. Slash costs to the bone and get increased response from your mailings.



The Arc Tangent system is engineered for substantial mailing lists and saves you thousands of dollars. It could pay for itself on the first mailing!

Professional Mail

The heart of the system, Professional Mail generates and manages your entire mailing — including these advanced features:

- Database fully customizable; unlimited number of names and addresses
- Eradicate duplicates — even complex "sound-alike" dupes on up to 6 lists at once
- Presorting of 1st, 2nd, and 3rd Class Mail
- Supports 5-digit, Zip+4, Zip+4 Barcode, Basic Bulk, and Carrier Route
- Prints required Post Office reports
- Samples new lists (Test a list by mailing to every 10th address.)
- Highly personalized form letters
- Print any mailing label, including Zip+4 Barcodes
- Convert valuable lists from dBase and others
- Novell network version available

ZIP++

With a CD containing every valid address in the U.S, ZIP++ cleans your lists for the highest accuracy you can possibly get. Give it an address and ZIP++ will tell you what postman will deliver it! (And print the Carrier Route with the address.) Save money on postage and printing, improve the quality of your mailings, and get the best results possible.

- Correct bad addresses
- Missing City? ZIP++ can still find it.
- Insert Zip+4 codes
- Insert Carrier Route codes
- Compare each address against the USPS database of all mailing addresses in the US
- Highly accurate — issued 4 times a year
- Slash rates with Zip+4 codes
- Slash rates even more with Carrier Route codes
- Bare-bone rates with Barcodes printed on dot-matrix, laser, or direct-impression printers
- Certified by the U.S. Post Office for accuracy
- NEW Version 2.1 lets you correct and print a single piece "on the fly."

Merge-Purge

Rid your lists of bad and undeliverable addresses and get real savings. Merge-Purge has the same professional-level features of Professional Mail, but is sold separately for those who want the power of Professional Mail's merge-purge capabilities while managing their lists with dBase, R:Base, ASCII and other general-purpose database files.

- Detect dupes, near-dupes, or "sound-alike" dupes on up to 6 lists at once.
- Merge dupes from 6 files into one file
- Handles any size list

Arc Tangent, the leader in the mailing-list industry, offers the most powerful package available on any PC, you'll save thousands — both on postage rates and printing costs. And this industrial-strength system is easy enough for any PC-user to understand.

ARC TANGENT

Arc Tangent

HR8600 ZIP++ 5½" & 3½"	$195.00
HR4065 Merge Purge 5½" & 3½"	$149.00
HR4060 Professional Mail 5½" & 3½"	$695.00

Professional Mail and Merge Purge require a hard disk. ZIP++ requires a CD-ROM reader.

Powerful Windows Performance, Amazingly Modest Pricetags.

Perfect Screens, Lightning-Fast Memory, Extra Ports.

Boca Research, the price-performance leader in the microcomputer industry, comes through with a full range of solutions at prices you can afford.

BasicVGA. The lowest-priced, 16-bit, standard VGA board made in North America. Available in two models — 640×480 or 800×600.

SuperVGA w/512KB. Add 800×600 in 256 colors and 1024×768 in 16 colors. The 16-bit design is 50% faster than 8-bit boards.

SuperVGA w/1MB. All the above plus 1024 x 768 in 256 colors in either interlaced or non-interlaced modes.

BOCARAM/AT Plus. Boca memory boards (in your choice of DIPS or SIMMS) are top-rated by PC Week and approved by Novell. Expandable to 8MB per board and available in four configurations *(see the price box).* Supports conventional, extended or expanded memory.

IO/XT. Add extra serial and parallel ports in any PC. The IO/XT has a built-in clock/calendar and is available with one serial and one parallel port — or two serial and one parallel port.

IO/AT. For ATs and above, the IO/AT does not include a clock/calendar. Also available with two serial and two parallel ports (including one bi-directional parallel port).

BOCA boards come with a 5-year Warranty, free technical support, and a 24-hour BBS.

Boca Boards

IO/XT or AT w/1S & 1P	$65.00
IO/XT or AT w/2S & 1P	$65.00
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AT Plus SIMM w/0MB	$120.00
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AT Plus DIP or SIMM w/2MB	$240.00
AT Plus DIP or SIMM w/4MB	$355.00
AT Plus DIP or SIMM w/8MB	$560.00
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Basic VGA 800×600	$75.00
Super VGA w/512KB	$135.00
Super VGA w/1MB	$155.00

Automatic Protection Against Power Failures.

Better Than a UPS. Automatically Saves and Shuts Down Your System.

Introducing Powercard — the internal power system that's head and shoulders above any UPS. A UPS (Uninterruptible Power Supply) is not exactly user-friendly. When your building loses power, things get frantic. The alarm on your UPS screams to let you know you have 5 minutes to safely finish what you're doing (can you finish in time?), then close your files and safely shut down your system.

With Powercard safely installed inside your computer, you're protected and have nothing to worry about. Powercard automatically freezes everything you're working on and safely shuts down your computer. Nothing lost. Everything saved.

Only Powercard Is Totally Transparent.

Only Powercard uses absolutely none of your memory. It uses no device drivers, no TSRs, no extended or expanded memory. There are no chances of conflicts because Powercard has its own memory chips on-board, out of harms way. As far as the operating system is concerned, Powercard is 100%, totally transparent.

Other firsts — Only Powercard fully supports up to 32 MB of memory and up to 8 MB of disk cache. Only Powercard supports dual monitors. Only Powercard supports and is totally transparent with Windows — in all its modes. Only Powercard supports SuperVGA up to 1 MB, and the new HiColor 32,768-color video adaptors.

Powerful.

The Powercard's strong 180-watt output capacity means it can be installed in virtually any PC regardless of size or type. And the advanced power storage can protect you from 10-30 shutdowns per day. After a restore, Powercard automatically re-enables itself, immediately protecting you from another shutdown.

Powercard

HR6910 Powercard 5¼"	$299.00

Requires hard disk, 5¼" drive, 1½ full-size slots. (3½" disk avail.)

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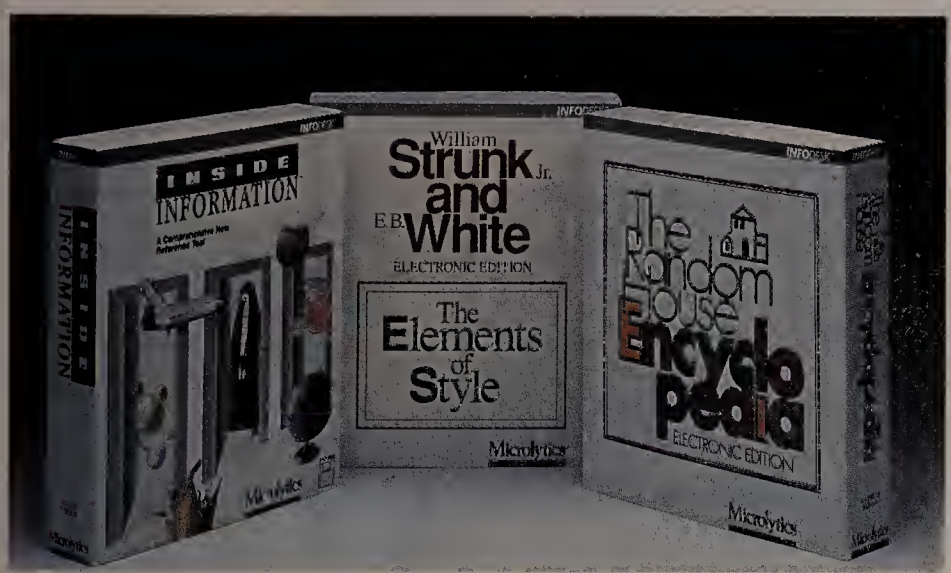
Inside Information

This new Desk Accessory is a comprehensive reference tool which organizes the English language into logical Categories of defined words. Far more than a dictionary or thesaurus, INSIDE INFORMATION lets you quickly and easily explore any of seven general Classes: Nature, Science & Technology, Domestic Life, Institutions, Arts & Entertainment, Language, and The Human Condition. These Classes contain 20 Subclasses, 125 Categories, and 700 Subcategories.



Categories are defined by subject matter, such as Chemistry, Law or Music — or by a common property, such as Colors, Tools, Verbs of Motion — or even a specific usage, like Insults, Slurs & Epithets.

Dig deeper into each Class in three different ways: outline view, graphic view or tree view. The reverse dictionary lets you type a few descriptive words then see a listing of appropriate terms and definitions.

Strunk & White's Elements of Style

Reviewer's have called it "...the best of its kind" and raved, "The work remains unparalleled, direct, correct and delightful." Now **The Elements of Style** is available for your Apple Macintosh or IBM PC compatible computer.

Based on an original work by William Strunk, Jr., a Professor of English at Cornell University, this update third edition, prepared by noted writer and grammarian E.B. White, has become a classic of conciseness. It's the ideal tool to make your writing crisp, succinct and powerfully effective.

Anyone who needs to communicate effectively in writing will find *The Elements of Style* packed with specific, pertinent examples to improve writing style and structure. It's and easy-to-access educational reference work for the rules and principles of correct English usage. Includes seven rules of usage, eleven principles of composition, several matters of form, a list of often misused words and a style guide.

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HR3200 Inside Information 3½"	$99.95
HR2000 Inside Information Mac	$99.95
HR3600 Elements of Style 5¼" & 3½"	$59.00
HR2600 Elements of Style *Mac*	$59.00

World's Highest Quality, 256-Gray Scale Hand Scanner!

Logitech brings you the ultimate in scanned-image clarity and detail...

We've gotten used to the limitations of scanned images, I guess. We're not surprised when a scanner produces an image that's not bad — but not great, either. We sort of expect low-quality. Which is why the ScanMan 256 from Logitech blew the lid off of our lab the first time we slid its ergonomic case over a black and white photo!

This incredible new instrument is utterly amazing, capable of professional-quality scans every time for photos, detailed line art, monochromatic images and more. It delivers 256 levels of gray — not just 64, or 16 — but 256 individual levels for ultra high quality. They're bright, crisp, clean, highly detailed and require no touch up whatsoever.

Superior image construction and unmatched clarity makes editing and manipulating your scans simple and precise. The secret is the innovative new red scanning beam. It produces 7 times more light (the critical factor in capturing minute detail and sharp contrast) than other scanning light colors. And the ScanMan 256 is built like no other scanner we've seen. It's balanced, so you can move at a consistent speed for the best possible reproduction. And only the ScanMan 256's Image Memory Manager swaps image data between your RAM and hard disk, so you can quickly work with even the most memory-intensive images.

The Scan Itself...

With most scanners, the act of moving across the image is less than scientific. Move too slow, you get muddiness, move too fast and you lose detail. If you don't scan in a perfectly straight line, the lovely young lady in your photo scans like something out of a Picasso painting. The ScanMan 256 eliminates the guesswork, trial and error and frustration.

The ScanMan 256 features a scanning speed indicator. Turn it on and it's green and ready to go, begin scanning a little too quickly the light turns yellow, then red if you're moving too fast to capture the image properly.

Scanning For Desktop Publishing

Using the ScanMan 256, you not only get great scanned images, you can do all kinds of very creative things with them, like create magazine-quality halftones, lighten or darken your images, adjust the contrast, reverse them, resize and rotate them, make line art out of photos and more.

The ScanMan 256 includes Ansel,™ an easy-to-use image editing software system that allows quick retouching, speedy zooms, great special effects and a host of image-manipulation features. Ansel is one of the most sophisticated packages we've seen, and a must even as a standalone package, but it's included FREE when you buy the amazing ScanMan 256.

Clean OCR Scans...

Here's where the advanced technology of the ScanMan 256 shows what else it can do. If you use OCR (optical character recognition) software to scan text, you know the "clean-up" factor you're faced with. The ScanMan 256 outperformed all other contenders in our OCR testing using a page of 11 point, Century Schoolbook type with 12 points of lead. It produced usable text with fewer errors, scanning faster than any other hand or full-page scanner.

The ScanMan 256 is a complete system, compatible with all leading desktop publishers and fully guaranteed by Logitech.

Also Available: The Cordless Mouse!

The MouseMan is a cordless, three-button, radio-controlled mouse! No cables, no line-of-sight positioning! The radio receiver can be placed anywhere — even under your desk — and still allows you to work with precise movement. It's fully Microsoft compatible and includes Mouse-2-3, designed for maximum Lotus 1-2-3 productivity.

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LOGITECH

HR2594 **ScanMan 256** w/Ansel	$329.00
HR2595 **Cordless MouseMan** ...*SAVE $70*	$129.95

ScanMan: *PC with 286, 386 (386 SX or 386 DX) or higher processor; MS- or PC-DOS 3.1 or higher; Microsoft Windows 3 or higher; 640K conventional and 256K extended memory (1 MB RAM); one floppy disk drive and a hard disk; CGA, EGA, VGA, 8514/A (SuperVGA) or Hercules graphic card, or compatible video graphics adaptor and appropriate monitor (VGA or higher graphic adaptor recommended for gray scale display).*

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"The Most Often Used Forms Design Software In The World."

— Dataquest, March 1991

It's easy to see why FormTool has become the world's best-selling, most used forms design software. It's fast, it's easy, and it allows corporations of any size to create forms for any information-gathering purpose.

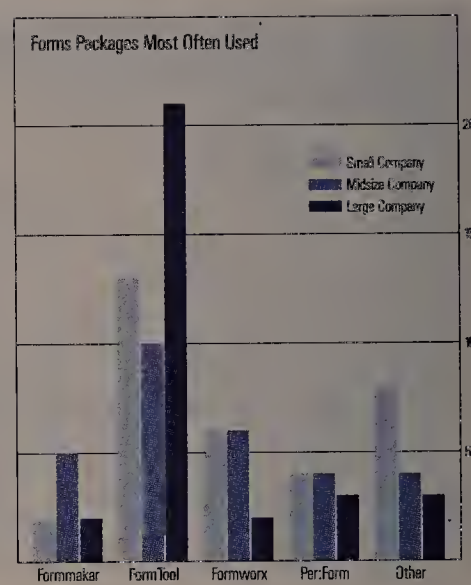
You probably already know about FormTool's text-based speed, its "Intelligent Line Drawing," and its ability to run beautifully on any 286 or 386 machine. You may even know that FormTool supports hundreds of dot-matrix and laser printers.

What you may not know is that while many other forms packages have appeared since FormTool's introduction, not one provides the ability to "just sit down and create a form" -- without even reading the manual!

In fact, FormTool has found a home in corporations like Ford, General Motors, NASA, Boeing, Hughes Aircraft, The U.S. Army, General Dynamics The U.S. Air Force — even the office of the President of the United States has a copy.

FormTool also includes "The FormTool Encyclopedia of Forms," a collection of professionally designed forms that you can use as is, or with your changes.

Order FormTool now from TigerSoftware for just $79.00 (regular price: $99.00).



Source: Dataquest, March 1991. Total Responses = 161, Manufacturers = 45, Health Services = 38, Finance = 15, Business Services = 19, Others = 44. The above chart reflects products named by those surveyed.

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FORMTOOL GOLD

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IBM PC, XT, AT, PS/2 or compatibles with 265K. Floppy or hard disk, supports all color or monochrome monitors with or without graphics cards and virtually all dot-matrix printers, daisy-wheel and laser printer.

If You Bill Your Time...

Easily Prevent Billable Time from "Slipping through the Cracks."

Do you know which jobs are the most profitable and which ones are a complete waste of time? Do you know which clients have outstanding accounts receivable? Are you billing all of the time you're entitled to or do billable hours "slip through the cracks?" For people who bill for their time, tracking it may be the toughest job of all. Many professionals, including architects, law firms, designers, CPAs, ad agencies, engineers, repair services, project managers and others are turning to the software system designed specifically to calculate and report all time spent on each job.

Timeslips® III is fast, easy, flexible time and expense recording along with a complete set of financial and productivity analysis tools. It's so simple to use, it practically runs itself, and features a pop-up timer function that can be accessed anytime — from within any application.

Different clients require different bills. With Timeslips III you have the power of custom billing.

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Edited by ERIC BENDER

Despite IBM's Efforts, Most Developers Stick With Windows

Windows 3.1 Set for World Domination

Upgrade to Fix Bugs, Boost Speed, Offer Friendlier Face

Working with *Windows 3.0* can be like driving a very fast car that suddenly stalls. You're zipping along in your snazzy new software, when up springs a box reading, 'Unrecoverable Application Error'. This is *Windows'* way of politely telling you that you have crashed, and must shut down and reboot.

This problem is common enough to make many customers, particularly those in the Fortune 1000 who push software to the limit, wonder if *Windows* itself is an Unrecoverable Application Error. While Microsoft is touting numerous important advances for the upcoming *Windows 3.1*, breaking the UAE jinx may be the most important.

"There's a lot of attention being paid to the little box that comes up and says UAE, and Microsoft needs to fix that," says Bill Higgs, vice president for software research at Info-Corp in Santa Clara, California. When *Windows 3.1* arrives early next year, its "biggest value to most customers will be greater reliability," agrees one leading developer. Microsoft will provide that by reducing bugs, adding safeguards, and offering more powerful programming aids.

More obvious will be *Windows 3.1*'s friendlier Program Manager/File Manager desktop. In addition to many other ease-of-use improvements, the File Manager has been redesigned along the helpful lines of DOS 5.0's shell, and you can directly pick up a file and move it to another directory, or print it by dropping its icon on the Print Manager.

Windows 3.1 will offer many helpful cosmetic improvements plus a File Manager that looks very much like DOS 5.0's shell.

Performance should get much zippier with optimized memory and disk usage. Moreover, you should find it easier to configure your PC—previously a major frustration for beginning users. The environment also should play more happily on local area networks. It also will boast built-in TrueType scalable fonts that match printed output. (*Adobe Type Manager* and Bitstream's *FaceLift* do the same, but TrueType will come as part of *Windows*.)

More subtly, *Windows 3.1* adds support for embedding and linking objects (like graphics or worksheets) between applications. You can embed a *Paintbrush* image in a *Write* document, for example; double-click on the image, and up springs *Paintbrush* to help you polish it. You can also link the image so that when you change it in *Paintbrush*, it updates in *Write* (each application must be rewritten to support this).

While *Windows 3.0* packages will run without modification, the droves of *Windows* developers are working on the relatively small changes necessary to exploit the new release. Developers are also closely watching Microsoft's progress with *Windows NT*, a 32-bit version, expected in about a year, that will require substantial reprogramming. This product will offer sophisticated multitasking, multiprocessor support, and other advanced features and will run on RISC workstations as well as on Intel PCs. With this release, "*Windows* is being enhanced with industrial-strength capabilities," says Steve Ballmer, Microsoft senior vice president for system software. Further off, Microsoft wants to see a version of *Windows* in just about everything more intelligent than a toaster.

IBM Tries Shutting Windows

But former Microsoft ally IBM has different plans. Its OS/2 2.0 has reached industrial strength and should appear this fall backed by a hard-hitting campaign to woo users and developers away from Microsoft. The result will be plenty of choice and plenty of confusion.

(continues)

Windows 3.1 will add TrueType fonts and powerful ways to link "objects" (such as worksheets) between packages.

After codeveloping OS/2 for four years, Microsoft turned its back on it in January to emphasize *Windows*. The move surprised no one outside IBM but deeply angered executives there. Big Blue began throwing around its $60 billion–plus weight, pumping resources into OS/2, and inking serious deals with Borland, Lotus, Micrografx, and others. "This is no longer IBM, it's a coalition around IBM," says David Marshak of Patricia Seybold's Office Computing Group in Boston.

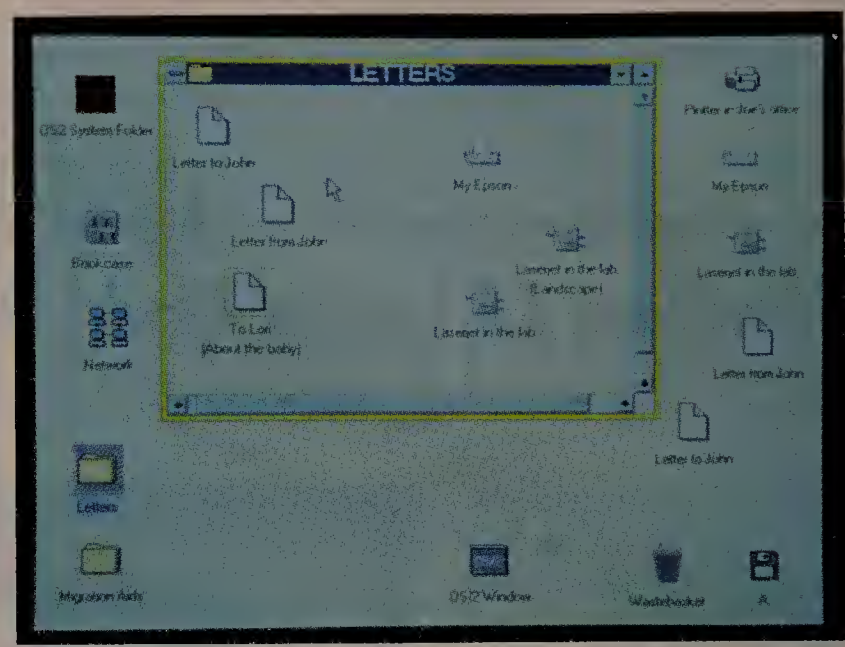
"If OS/2 2.0 can really do everything they say it's a home run product," notes one former IBM executive. OS/2 2.0 is a generation ahead of *Windows 3.1*—a 32-bit system built atop a robust architecture that efficiently and safely juggles multiple applications. Its Workplace desktop interface lets you directly manipulate icons; you can work with a document without ever worrying about which subdirectory it lives in. (*Windows 3.1*'s drag-and-drop capabilities are a limited incarnation of this direct-manipulation concept.) No small matter: OS/2 2.0 will run DOS and *Windows* very capably, without requiring you to buy either.

DOS support and high reliability are vital concerns to corporate users like George Oliver, manager of information delivery technology at the Royal Bank of Canada, Toronto. "*Windows* didn't meet the needs of the mission-critical network applications we require," he says. After seeing the new software playing to standing-room-only crowds at a June conference, one user summed up a common view: "OS/2 is off the respirator."

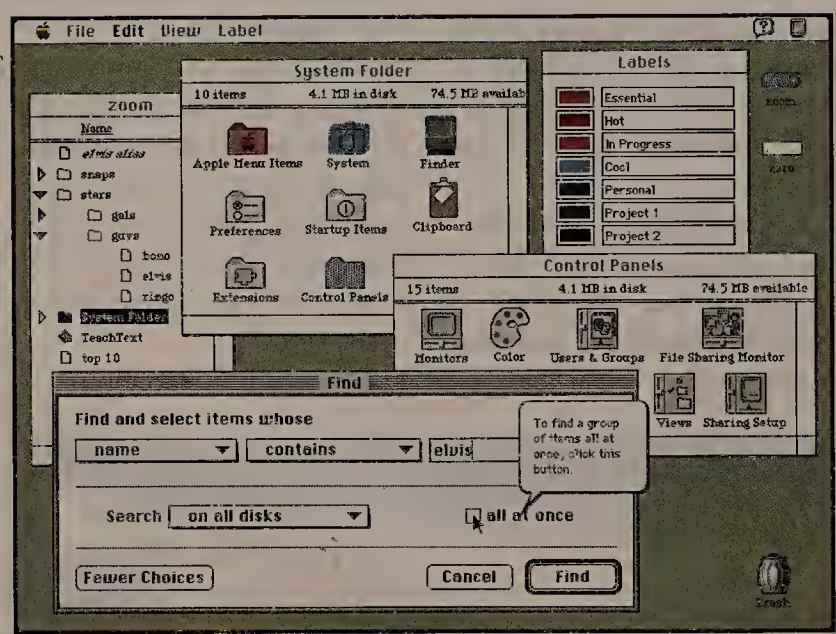
Prettier in Pink?

IBM has intensified its challenge in a stunning deal—a partnership with Apple Computer. The two giants have agreed to build an advanced object-oriented operating system based on Apple's next major cut at Macintosh system software, code-named Pink. Arriving in three years, this environment is supposed to run today's DOS, *Windows*, OS/2, and Macintosh software and will be licensed to other PC manufacturers.

This prospect, like everything related to PC system software, gets boos and cheers. Many customers and suppliers draw comfort from the golden vision of the two PC heavyweights, hand in hand, leading the way into the land of powerful and friendly object-oriented software. But analysts point to the huge difficulty in collaborating successfully on such projects, and some maintain that IBM's system software strategy is to shoot from the hip in all directions. "Why should anyone be interested in OS/2 2.0 when IBM has committed to marketing a better operating system in three years with Apple?" asks Jeff Silverstein, publisher of the *Software Industry Bulletin* in Stamford, Connecticut.



OS/2 2.0 should provide a friendlier user interface than Windows 3.1 and run multiple DOS and Windows packages smoothly.



Apple's talent with dazzling system software—like the Macintosh's System 7—has drawn IBM into a startling partnership.

Windows: The Midterm Mainstream

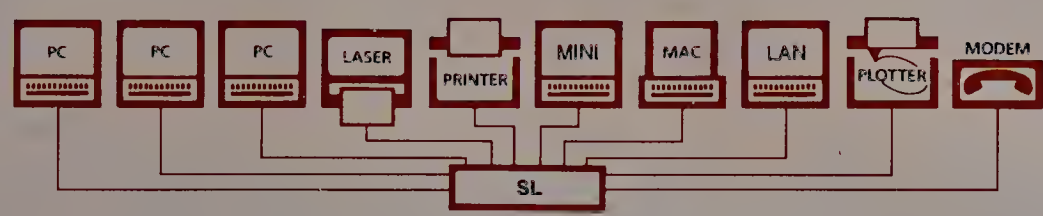
"IBM has decided to endorse every operating system in the world except for the one that will be the most popular on its hardware," grouses Microsoft's Ballmer. But despite all Big Blue's moves, Ballmer maintains that "*Windows* applications are the only safe choice." Most software developers (who act as barometers of industry acceptance) believe he's right: Microsoft has shipped 50,000 kits for *Windows;* only three dozen developers have publicly committed to build packages specifically for OS/2 2.0.

Even the software vendors that were the most gung ho on OS/2 switched their programmers back to *Windows* last year. "*Windows* is by far our heaviest investment now," says Kevin Conway, vice president for North American operations at Software Publishing Corporation in Mountain View, California. "It's about 60 percent of our development effort."

Moreover, firms like Software Publishing shudder at the thought of a prolonged public debate about system software. "Let's get these corporate ego wars over with," Conway says. "Nobody wins—especially not the consumer."

Still, advances in system software require a long, slow march, and users can expect many detours ahead. And for industry leaders like IBM and Apple, offering distinctive system software "is a strategic necessity," comments Paul Zagaeski, senior analyst with The Yankee Group in Boston. New rules of the game may pose heightened challenges to customers as well, adds Jeffrey Tarter, publisher of *Soft-letter* in Watertown, Massachusetts. "Instead of generic system software and differentiated hardware, vendors will offer generic hardware and differentiated system software," he explains. That translates into tricky new questions for buyers. —*E. B.*

Big Business Productivity For Small Workgroups



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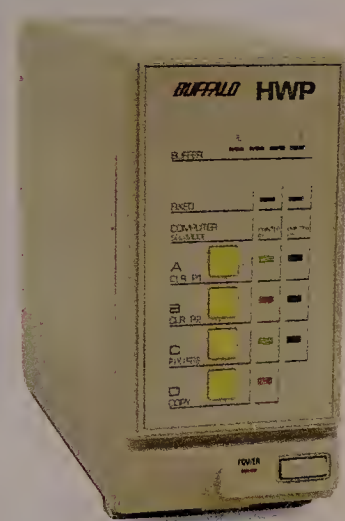

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HXS	4 Serial	Any Combination	256KB - 16MB	Pop-up or Buttons	**$295** / 256KB **$395** / 1MB
HWP	5 Parallel	3/2 4/1	256KB - 16MB	Pop-up or Buttons	**$295** / 256KB **$395** / 1MB
HXP	4 Parallel	2/2 3/1	256KB - 16MB	Pop-up or Buttons	**$245** / 256KB **$345** / 1MB
HCP	2 Parallel	1/1	256KB - 16MB	One Printer	**$225** / 256KB **$325** / 1MB
AS-41	5 Parallel	4/1	None	One Printer	**$195**
AS-31	4 Parallel	3/1	None	One Printer	**$175**

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Borland Dominates PC Data Bases

Blueprint for Ashton-Tate Merger Taps New Technology

What if? What if Borland can cleanly link the huge installed base of *dBASE* applications and data files to its *Paradox* data engine? What if it can enlist the thousands of corporate and professional programmers who kept *dBASE* alive in spite of Ashton-Tate? What if Borland can let users tap personal and/or corporate data using a spreadsheet macro, a *dBASE* query, a SQL command, or whatever works for them?

Then, according to Borland chief executive and technical guru Philippe Kahn, hundreds of thousands of *dBASE* and *Paradox* users will see their productivity soar—and continue to have data management their way despite the coming fights over how to connect PCs to corporate data.

"It's great to see a product we still believe in, *dBASE*, combined with a good company," says Rock Blanco, vice president of information systems at Garber Travel Service in Boston. Blanco uses *dBASE* to link 900 travel agents and 500 corporate customers on a variety of platforms to a central data base. He prefers *dBASE* to *Paradox*, "but taking the features *dBASE* has to offer, like the Control Center, and bringing them into *Paradox* will serve our needs perfectly."

While other users worry about where Borland will take *dBASE* for DOS, evidence of the plan's overall merit should arrive before year-end in the form of the *dBASE for Windows* compiler/interpreter and *Paradox for Windows*. These will be the first of a C++-based series with an object translator that lets you, say, use a *Paradox* query by example to access a spreadsheet file or a spreadsheet macro to tap *dBASE* data.

The Money to Muscle Code

If its $440 million stock swap for Ashton-Tate is completed next month as planned, Borland will be ideally positioned to shepherd PC data bases through the 1990s, say analysts. It will have clear title to more than 70 percent of PC data base sales and be one of the industry's five largest software companies.

Borland doubled both profits and revenues to $26.8 million and $226.8 million, respectively, in the fiscal year ended March 31. It could end this fiscal year with revenues of $600 million, a war chest of about $150 million in cash (two-thirds of it from Ashton-Tate), and little debt, says Charlotte Walker, analyst at Labe, Simpson & Company in New York.

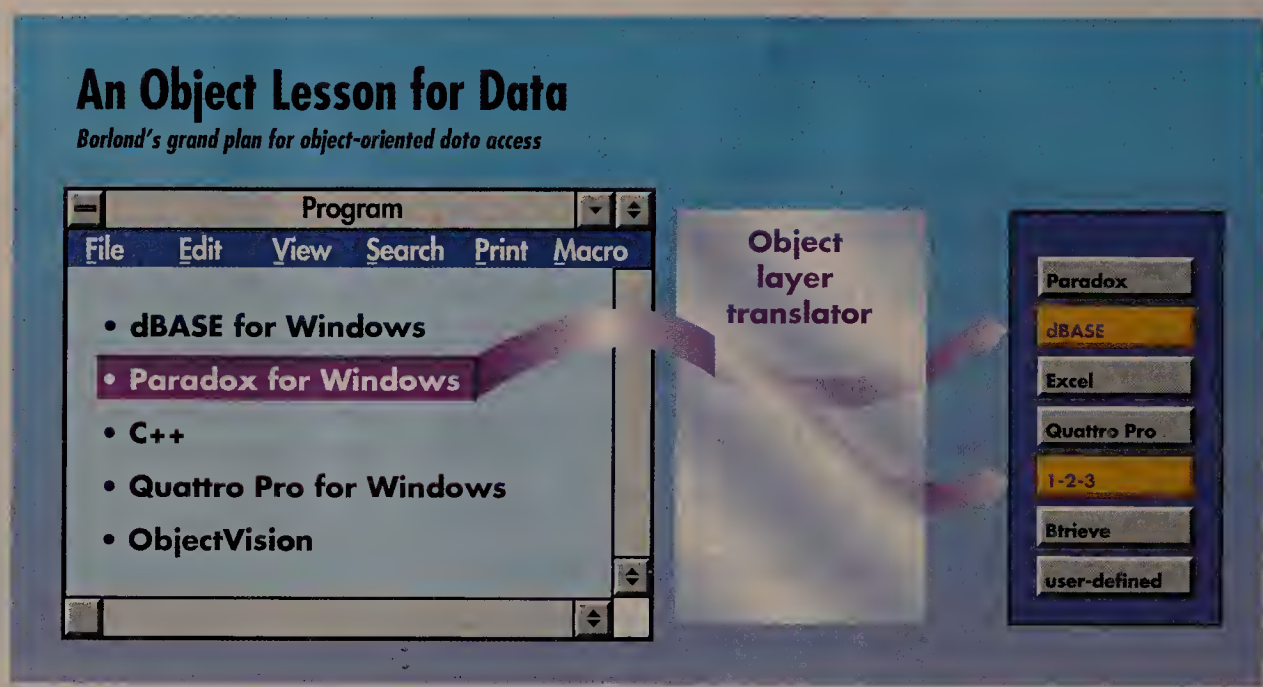
Big Fisherman

Borland now is looking past PCs to the epic migration of mission-critical corporate data—now residing mostly on minis and mainframes under products like *Oracle* and IBM's *DB2*—to various client-server systems. "Now that we're a big fish, we have to find bigger ponds with still bigger fish," says Borland vice president and data base/connectivity general manager Rob Dickerson.

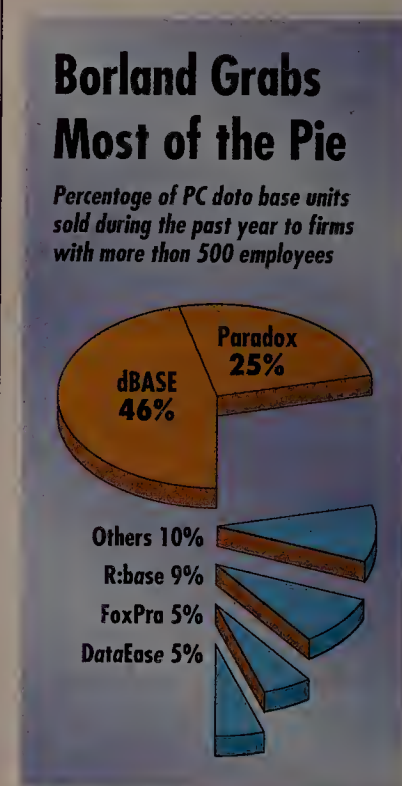
Borland will sustain Ashton-Tate's current line of products as appropriate, says Dickerson, but will focus research and development on spreadsheets, languages, and data bases—especially DOS versions of *dBASE*.

Its language prowess could make *dBASE the* corporate language and data base standard, says Michael Masterson, president of Masterson Consulting and founder of the Silicon Valley dBASE Language Group. "That's what's exciting: This might, once and for all, legitimize dBASE as a language."

Borland's technology has always been oriented toward bridge building; at its core is a dynamic code base much closer than most to the object-oriented ideal that is supposed to solve all our cross-platform and cross-application problems. With today's software alliances collapsing and former partners scrapping over tomorrow's standards, that could turn Kahn's promise into genuine user productivity.
—*Mike Hogan*



Borland's product integration strategy is an object-oriented layer of code in new applications. This will let users give commands in one package that will be recognized by another.



The combined share of dBASE and Paradox gives Borland a vast advantage over its PC data base competitors, says Computer Intelligence.

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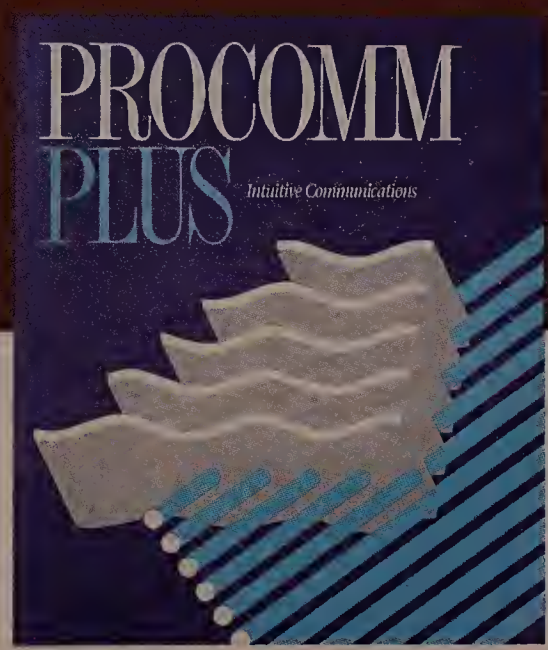

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Windows Opens for Presentations

New Focus: Managing the Presentation as a Whole

While other *Windows* programs are emerging slowly, everybody who is anybody in the software industry is hawking *Windows* presentation packages. Perhaps, say users, this breed of software makes the best use of *Windows'* graphical orientation and knack for integrating applications.

Unlike the DOS predecessors that kept you focused on the nitty-gritty, the *Windows* programs "were designed from the ground up for managing presentations, and they show it," explains Keith Thompson, president of Datalex, a training and consulting company in Amherst, New Hampshire.

So far, *Windows* entries have gained only a small slice of the market. "*Harvard Graphics* still outsells Microsoft's *PowerPoint* by four to one," reports Joan-Carol Brigham, director of graphics research at International Data Corporation in Framingham, Massachusetts. But, says Brigham, "as more and more people adopt *Windows*, that's going to change"—particularly in corporations. Adds Arthur Block, vice president for Manufacturers Hanover Trust in New York, "If [these packages] weren't *Windows*, we wouldn't look at them."

Tight links between Excel and PowerPoint help Bill Warden create client reports as he does other work.

Presenting a New Metaphor

"As a group, these products are trying to define a new metaphor for how you create and work with a presentation," says Tim Davenport, vice president of Lotus's graphics division. "The metaphor is basically that you work with one entire file made up of the pages in your presentation."

In that, *Windows* presentation managers diverge sharply from the data-and-graphics path followed by DOS stalwarts like *Freelance* and *Harvard Graphics*. Instead of concentrating on the way data and graphics work together, these new products focus on managing the presentation. You reorganize a presentation merely by shuffling titles in an outliner or clicking and dragging among a show's worth of miniature slides displayed together on a single screen.

"For general presentation material, if you're not dealing specifically with graphs, I find *PowerPoint* easier than *Harvard*," says Doug Demos, networking systems programmer with Storage Technology in Louisville, Colorado. "But *Harvard* I find better at graphmaking and in the ways it lays out graphs." Other users add that DOS packages are much less ravenous for hard disk space.

Working With Windows

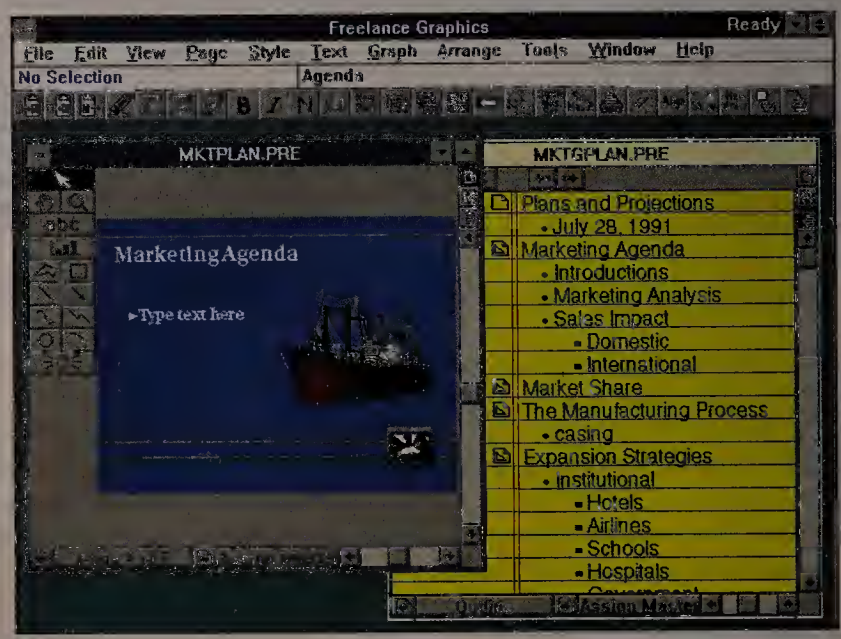
With its built-in drivers, standardized interface, and overall visual flair, *Windows* is ideal for quickly and easily designing and producing eye-catching slides, transparencies, and handouts. Describing the applications' appeal, "I end up talking about *Windows*," remarks Datalex's Thompson.

A standard look and feel means products that once competed on the basis of their interfaces will now have to compete on the basis of their features, which means they must provide more power with less training, says Lotus's Davenport.

Packages also must work together. "The disadvantage with DOS-based products is lack of portability and the fact that applications don't work together simultaneously," says Salim Merchant, senior PC specialist at Conner Peripherals in San Jose, California. "In *Windows* I can have *Charisma* open in one window and *Hollywood* in another and move data back and forth easily."

Integrating *Excel* spreadsheet data and the associated chart in a *PowerPoint* presentation, Bill Warden says, helps him to plan the reports he will make to clients. "I'm already thinking about how I'm going to convey this information to somebody while I'm doing the work," says Warden, who is vice president with Weber Management Consultants in Huntington, New York. —*Mark Henricks*

Mark Henricks is a contributing editor for PC World.



Freelance for Windows simplifies presentation building with point-and-click power and ease of learning.

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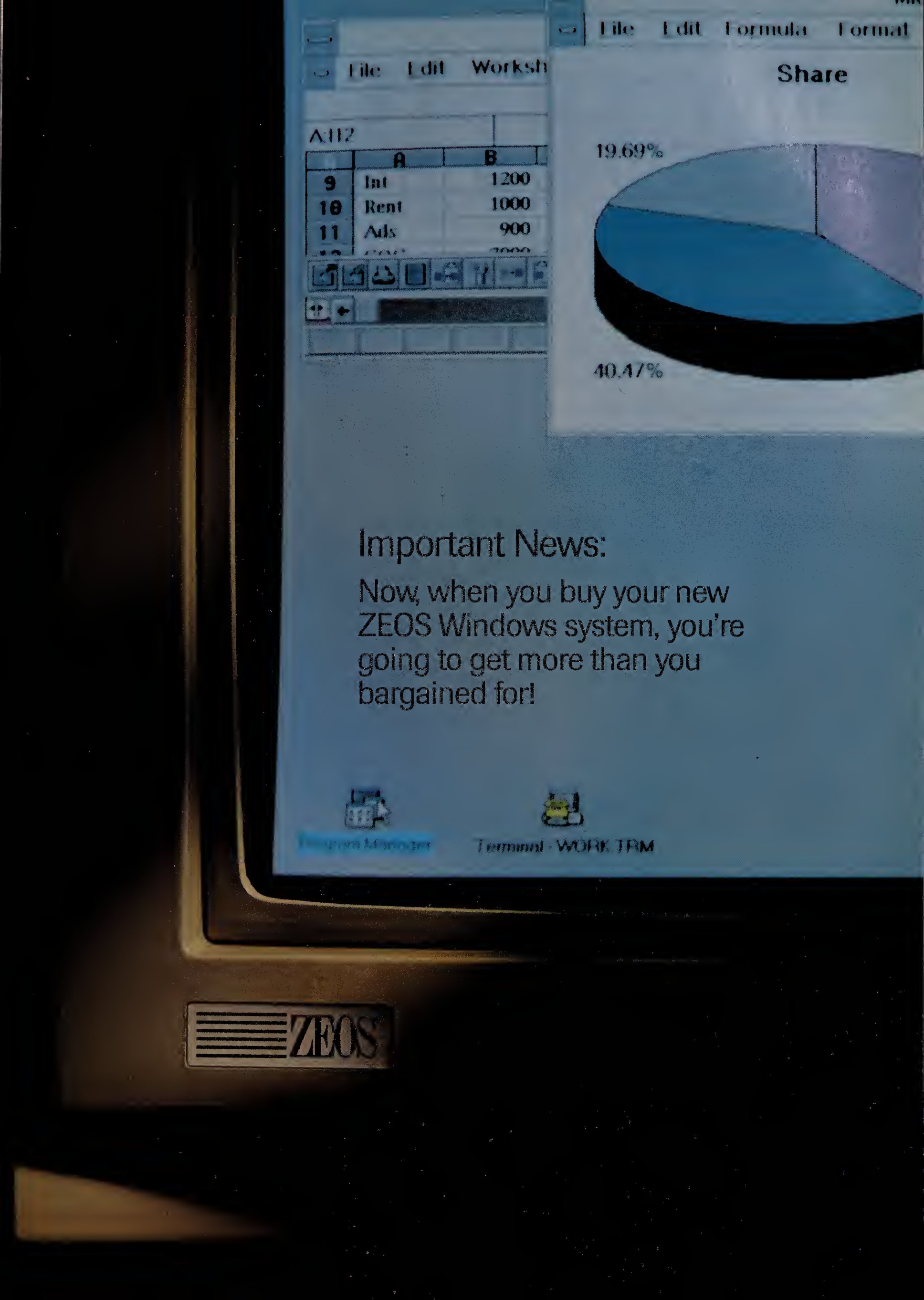
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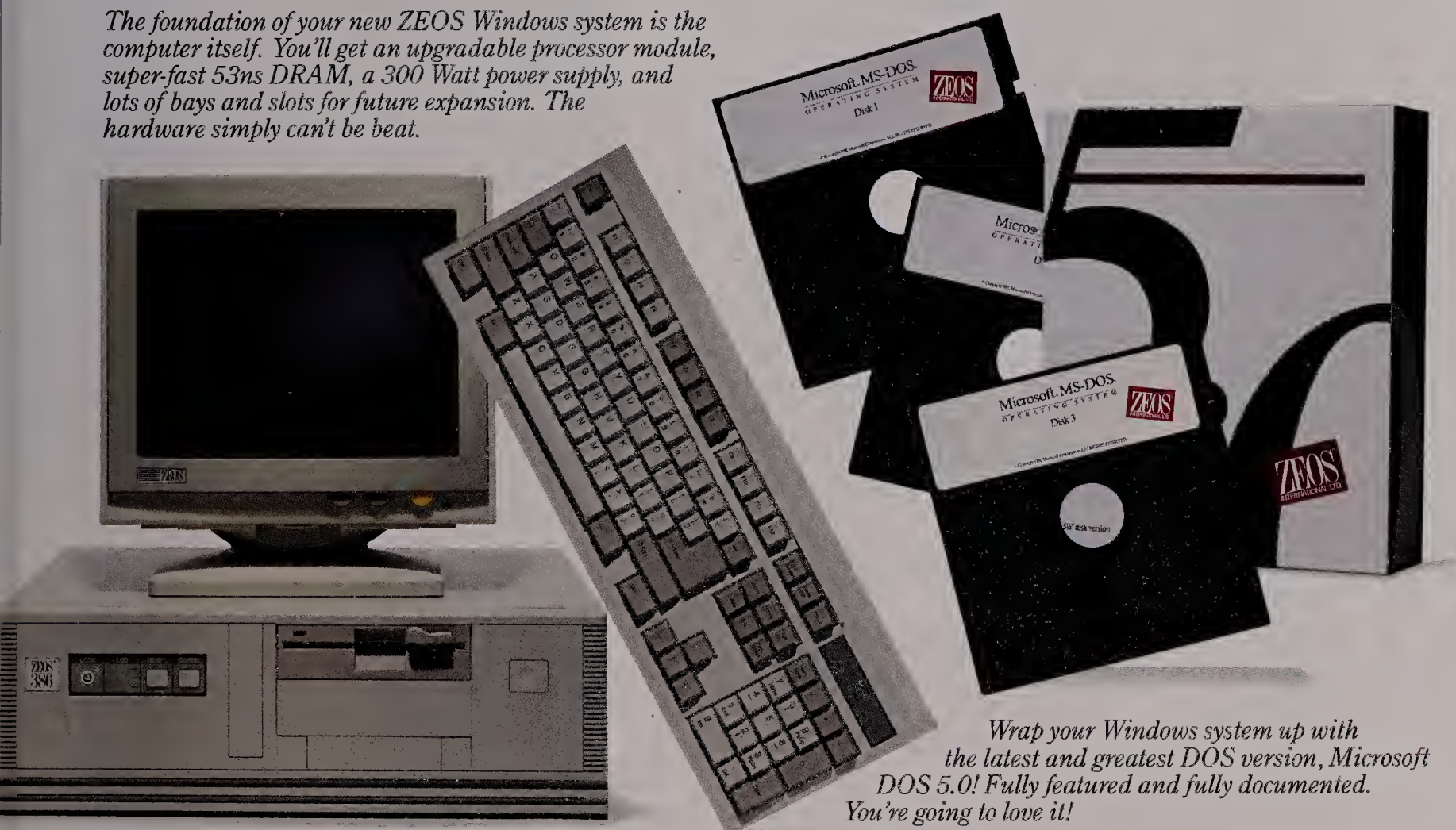


Wrap your Windows system up with the latest and greatest DOS version, Microsoft DOS 5.0! Fully featured and fully documented. You're going to love it!

self in and fire up *Windows* with Lotus *1-2-3* and *Ami Pro,* you're in for the ride of your life!

After all, nobody knows spreadsheets better than Lotus. And when they sat down to write *1-2-3 for Windows* they created a masterpiece. It starts out as a full-fledged *Windows* application. Offering that perfect balance of power and simplicity, it remains fully compatible with all the earlier versions of *1-2-3*. And it's absolutely loaded with new features.

Power, Simplicity, complete Compatibility *plus* loads of new features. It's Lotus *1-2-3 for Windows* and it comes with every ZEOS Windows system. And so does *Ami Pro 2.0!*

After all, *Ami Pro 2.0* is the Lotus word processing program that was designed for Windows from the ground up. Linking with a full suite of Windows applications *including* your new Lotus *1-2-3 for Windows, Ami Pro 2.0* is perhaps the finest word processor on the market today.

Buying your new ZEOS Windows system is possibly the best purchase decision you'll ever make. Then add to it Lotus *1-2-3 for Windows, Ami Pro 2.0* plus *Windows 3.0, DOS 5.0* and a genuine Microsoft mouse. It's an offer that can't be beat and one we simply can't offer for long. So pick your new ZEOS Windows package now and we'll include a bundle! *Call now 800-423-5891!*

Upgradable. High Performance. Low Cost. And every ZEOS Windows system comes with Lotus *1-2-3 for Windows* and *Ami Pro 2.0* at no additional charge. Absolutely incredible!

With ZEOS 386-25s starting at only $1395 right thru '486-33MHz systems starting at $1795, computing will never be the same again! And it's not just the prices that make these new systems hot. It's Performance and Upgradability as well.

UPGRADABLE CPU

When we first sat down to design these new systems, we wanted computers that would *blow the doors off* anything else out there. Plus, we wanted you to be able to upgrade from one CPU to another as your computing requirements changed, *without having to buy an entirely new system.* The results?

Incredibly low cost, high performance systems so very advanced you can move freely from the '386 family of processors to the latest '486s all without a moment's hesitation.

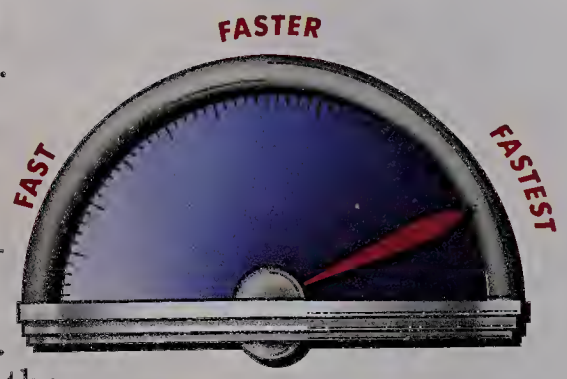
Now, you can pick your power! Today *and* tomorrow. Choose from high speed '386-25 and 33MHz systems, either cached or non-cached, plus the '486SX and '486-33MHz with or without a secondary cache. Whichever you decide upon you

Upgradable.

Hot New ZEOS '386

know that as your computing requirements change, your processing power can change as well. But are the prices really that good?

Yes. *Absolutely Yes!* The prices really *are* that good, and the quality too. Because when you buy from ZEOS you're buying directly from the manufacturer. Starting with the main system board, your new computer is designed and built by us right here in Minnesota. That saves money for you. And your ZEOS factory direct advantages are evident not only in the price, but in the performance and quality of your system too.



Z•SPEED METER

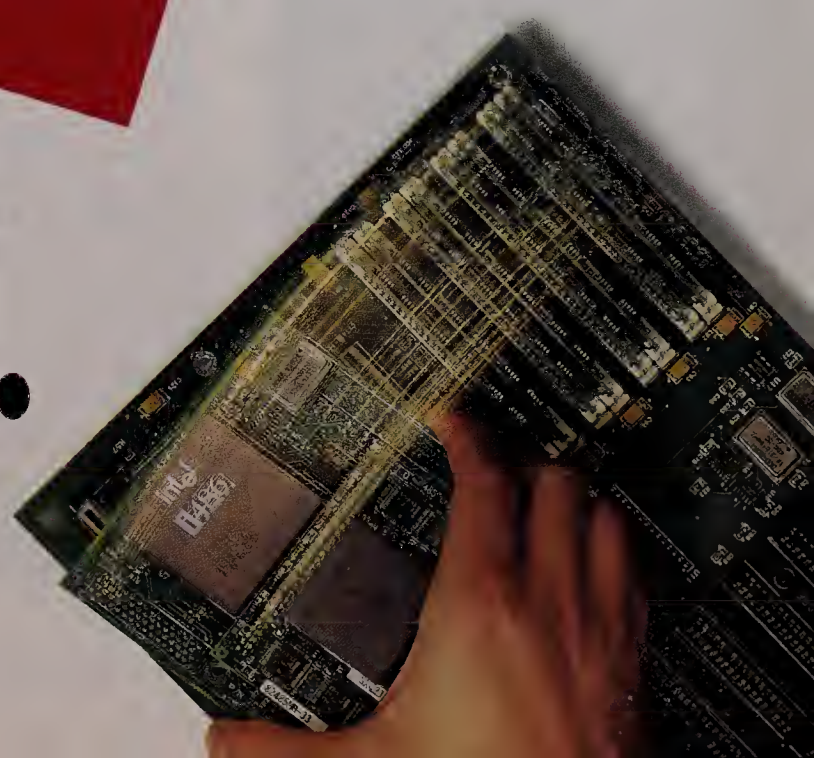
To help you select the processor option that's right for you, we have developed the Z-Meter. *The* Z-Meter *shows you the relative performance gains achieved by moving from one processor module to another—fast, faster, fastest! No matter which system you select you can be sure of one thing*—these babies are Hot!

So if you're looking for a high speed, upgradable, rock solid system supported like none other *and* you want incredibly low prices, you've found your company. And your computer. Read on!

This ZEOS ad reviews each of four money saving upgradable system packages based on processor type. For a limited time only, every ZEOS Windows system includes Lotus 1-2-3 for Windows and Ami Pro 2.0 at no additional charge!

Low Cost.

and '486 systems!



ZEOS. Your

For Vertical Systems add only $150.

Harnessing the ZEOS power and value you want is easy. Pick your processor then your package. Package #1 gets you up and running for a very reasonable price. To add even more options *and* savings select from Packages 2, 3 or 4.

Because when you select from Packages 2, 3 or 4 you receive VGA, additional memory, larger drives and more. You also receive *Windows 3.0* plus Lotus *1-2-3 for Windows* plus Lotus' great new *Windows* word processor *Ami Pro 2.0,* plus Microsoft *DOS 5.0* plus a genuine Microsoft Mouse. Nobody gives you this combination of hardware *and* software power. And it's yours, all for one low package price!

And that's just for starters. Because *inside* your new ZEOS system rests the very latest advancements in surface mount, high integration technology. As an example, we have freed two normally occupied expansion slots by placing our high speed IDE hard drive and floppy drive interfaces right on the main board. Then, we put the high speed serial, parallel and game ports on the motherboard too. The result?

Eight expansion slots, *seven* of which are available for your future use! After all, expansion and non-obsolescence are what these great new ZEOS systems are all about. We've built in some other very important expansion features for you as well.

Like our *300 watt* power supply. Providing you with all the pure clean power you'll need right now, your ZEOS 300 watt supply also provides you with plenty of power for the future as well. Plenty of slots, plenty of power. How about space? This is where ZEOS has performed something akin to magic.

It's your new ZEOS SpaceSaver case! Complete with *seven drive bays,* this incredible case is actually *smaller* than many cases offering only five bays. We've also added *a second whisper quiet cooling fan.* Why? Because whether you expand your system or not, the cooler it

ZEOS COMPLETE SYSTEM PACKAGE #1

- The Processor and Speed of your choice plus future upgradability!
- 1MB of High Speed 53ns DRAM, expandable to a system total of 32MB right on the motherboard.
- 42MB High Speed IDE hard drive with its own cache.
- 1.2MB or 1.44MB Teac® floppy drive.
- ZEOS 14" flat screen Hi-Res amber monitor with Tilt/Swivel base.
- Shadow RAM and EMS support for enhanced performance.
- ZEOS/RS 101 key SpaceSaver keyboard.
- Two Serial, one Parallel & one Game Port built right onto the motherboard.
- 7-16, 1-8 bit expansion slots. 80387 math co-processor support for '386 systems.
- Rugged ZEOS SpaceSaver case with twin cooling fans for added reliability and product life.
- Seven drive bays and our custom 300 Watt power supply for your future expansion!
- Includes ZEOS 24 Hour a Day Toll Free Technical Support and Customer Satisfaction package.

PACKAGE #1	
486-33	$1795
486SX-20	$1595
386-33	$1495
386-25	$1395

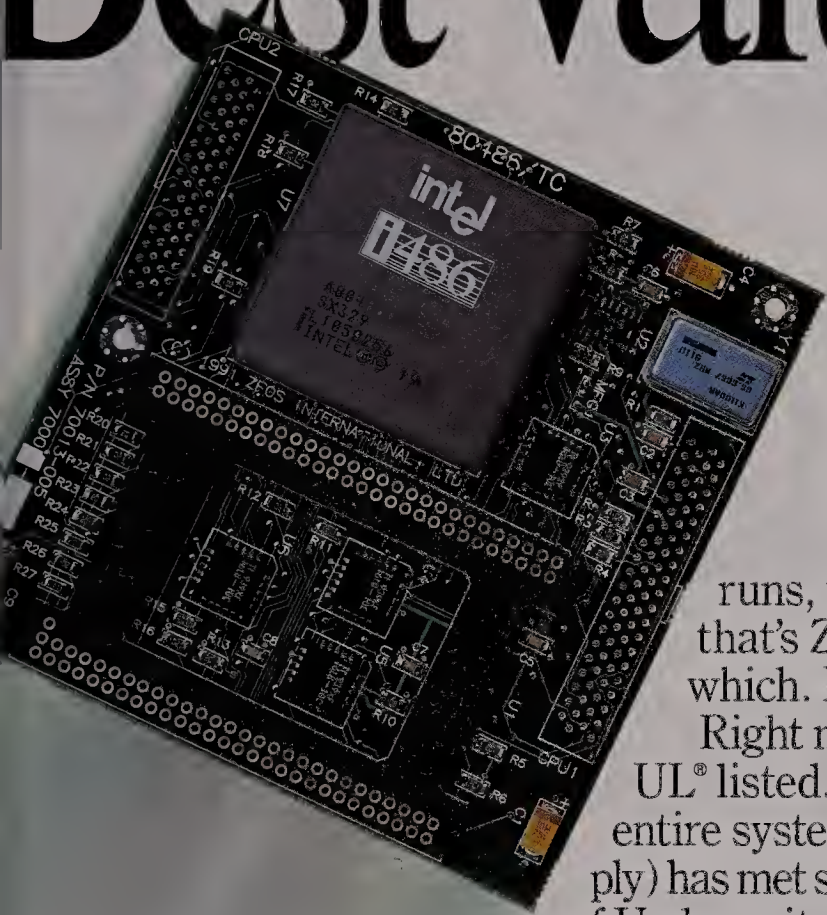
INCREDIBLE ZEOS PACKAGE #2

We take Package #1 and upgrade your ZEOS Modular System to include:

- 2 full Megabytes of Rip-roaring 53ns DRAM.
- Our incredible 85MB IDE hard drive with its own built in cache.
- Both the Teac® 1.2MB *and* 1.44MB floppy drives.
- The awesome Diamond SpeedStar Plus VGA graphics card Complete with 1MB DRAM.
- ZEOS 14" High Res VGA Mono Monitor with Tilt & Swivel base.
- Lotus 1-2-3 for Windows, *plus* Ami Pro 2.0, *plus* Microsoft Windows and DOS 5.0, *plus* a genuine Microsoft mouse!

PACKAGE #2	
486-33	$2395
486SX-20	$2195
386-33	$2095
386-25	$1995

Best Value!



runs, the longer it will last. Now that's ZEOS *value*. Speaking of which. How about UL® listings?

Right now every ZEOS system is UL® listed. This listing means your entire system (not just the power supply) has met stringent safety requirements of Underwriters Laboratories. We believe UL® listings also say a lot about quality. And UL® safety listings are something many of our competitors simply don't (or can't) provide. At ZEOS quality and safety are important to us. *You* are important to us.

Price. Performance. Quality and Support. There are *many* reasons to buy your new ZEOS upgradable system. Plus, your ZEOS advantages include *24 Hour a Day Toll Free* Technical Support, our 30 Day Money Back Guarantee and ironclad warranty, just to name a few (for more ZEOS advantages see the section entitled *"Why ZEOS is Your #1 Choice"*).

Selecting the new ZEOS system that best fits your needs is easy. Choose from any of the money saving packages shown here. Or let your friendly and knowledgeable ZEOS Systems Consultant help you configure exactly what you want from our huge selection of upgrades and options. Whatever you select, one thing is for certain.

Buying your new ZEOS system is perhaps the best purchase decision you'll ever make! So why not pick up the phone and give us a call right now. Incredible ZEOS power awaits you! *Call now Toll Free, 800-423-5891.*

486-33 $2895
486SX-20 $2695
386-33 $2595
386-25 $2495

INCREDIBLE ZEOS PACKAGE #3

Add even more memory, a larger drive. And more Savings! You now receive:

- **4 full Megabytes of Ultra High Speed 53ns DRAM.**
- **Our fast 130MB IDE hard drive with built in cache.**
- **Both Teac® floppies, the 1.2MB *and* 1.44!**
- **Your Diamond VGA Plus card with 1MB DRAM.**
- **ZEOS 14" 1024x768 VGA Color Monitor w/Tilt & Swivel.**
- **Lotus 1-2-3 for Windows, Ami Pro 2.0, Microsoft Windows, DOS 5.0 *plus* a Microsoft mouse!**

PACKAGE #3

486-33 $3395
486SX-20 $3195
386-33 $3095
386-25 $2995

THE ULTIMATE ZEOS PACKAGE #4

Now, Memory goes to 8MB and the drive to 210MB. The ultimate Power User's Dream Machine!

- **8 full Megabytes of High Speed 53ns DRAM.**
- **Your screaming 210MB IDE hard drive with its own built-in cache.**
- **Both Teac® floppies, the 1.2MB *and* 1.44!**
- **The Diamond VGA Plus card with 1MB DRAM.**
- **ZEOS 14" 1024x768 VGA Color Monitor w/Tilt & Swivel.**
- **Lotus 1-2-3 for Windows, Ami Pro 2.0, Microsoft Windows, DOS 5.0 *plus* a Microsoft mouse!**

PACKAGE #4

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ZEOS® INTERNATIONAL, LTD.

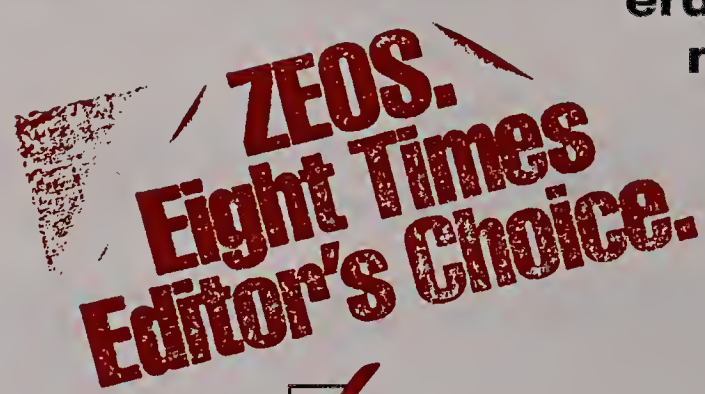
For Complete Processor and Package Pricing, simply turn the page!

Why ZEOS is

CHECK YOUR EXCLUSIVE

If you're deciding which new computer to buy, there are many important considerations.

Here, we've gathered together a number of these considerations for your review. Some are of obvious importance,



- Now, your ZEOS modular system allows you to upgrade from one CPU to another as your computing requirements change. Obsolescence is virtually obsolete!
- You may choose between a variety of '386 and '486 processor options, both cached and non-cached.
- Made in USA! Your new ZEOS system boards are designed and manufactured by ZEOS, right here in the USA.
- ZEOS has utilized the very latest in highly integrated surface mount technology. Faster, cooler, more reliable systems for you!
- Every ZEOS modular system comes standard with incredibly fast *53 nanosecond DRAM.*
- Plus, you may expand your system with up to 32 megabytes of memory right on the motherboard.
- Your new system features the *exclusive* ZEOS seven bay desktop case, smaller than most five bay cases yet plenty of room for future expansion.
- Two whisper quiet cooling fans move more cool air thru your system increasing reliability and component life.
- Your *entire* system is UL® listed (not just the power supply). Few others offer this security; we wonder why.
- Eight slots, one for the video, seven more open providing plenty of room as your system requirements grow.
- Two high speed serial ports, one parallel port and one game port.
- Our top quality 300 watt power supply provides you with plenty of power for your present *and* future needs.
- ZEOS uses *only* genuine Teac® floppy drives. Accept nothing less.
- Monochrome TTL systems feature Genuine Hercules® brand graphics controllers. Only the best for you.

Your #1 Choice!

ZEOS ADVANTAGES:

while others are subtle yet critical to your ultimate satisfaction. We'll go over them here with you one by one.

Please feel free to use these as a basis for comparison with other system vendors. We believe you will come away with the conclusion that *ZEOS is indeed Your #1 Choice.*

✔ VGA color systems feature the high-res ZEOS 1024x768 monitor with the incomparable SpeedStar Plus card complete with One Full Megabyte of memory!

✔ Special package savings are available incorporating our most popular upgrades. Many packages include Microsoft® DOS plus Windows and a Mouse!

✔ For a limited time every ZEOS Windows system also comes with Lotus *1-2-3 for Windows* plus Lotus' incredible new Windows word processor *Ami Pro 2.0!*

✔ *PC Magazine* said ZEOS offers "more options than even the most configuration hungry hound could possibly need." Let us build whatever you require.

✔ Everybody loves ZEOS' 24 Hour a Day Toll Free Technical Support. You can call for advice any time of the day or night, 365 days a year!

✔ ZEOS systems have been selected by *PC Magazine* as *Editor's Choice, Eight Times!* These, along with many other consumer and industry awards attest to ZEOS' consistent and outstanding value.

✔ Your new system is backed by our 30 Day Absolute Satisfaction Money Back Guarantee, One Full Year Limited Warranty and our Express Replacement Policy.

✔ Buy with confidence. ZEOS is a strong and rapidly growing public company (NASDAQ Symbol: ZEOS). We've been around since 1981. We'll be around for a long time to come as well.

✔ ZEOS offers you a wide variety of payment options including MasterCard, VISA, Discover, American Express plus our own Z-Card, the ZEOS credit card featuring low consumer rates. Credit terms are also available along with very attractive leasing programs to qualified corporate customers.

✔ Friendly, knowledgeable ZEOS Systems Consultants are available 24 Hours a Day by calling 800-423-5891. You can call any time.

When you add it all up, there's nothing like buying from ZEOS. There is certainly nothing like these new ZEOS systems!

CALL NOW TOLL FREE:
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Computers *Now!*SM

Take Your Pick. We'll Ship Today!

RIGHT NOW. GUARANTEED!*

Yes, we can ship your new ZEOS '386 or '486 today! We've built up an extra supply of the hottest selling computers in America in their most popular configurations.

Here's how it works. We have these incredible ZEOS '386 and '486 color VGA systems pre-built and ready to ship. While supplies last, we will ship any of these systems to you *the day you order* subject to these conditions:

1. Your order must be received by 1PM Central Time M-F.
2. Credit Cards are subject to authorization.
3. Orders must be for ZEOS '386 or '486 systems configured as shown here. Any other systems or upgrades are custom built and will take slightly longer.

Yes! We can ship your new ZEOS system Right Now! Place your order by 1:00 PM Central Time and we'll ship today. Guaranteed!*

Our most popular '386 & '486 packages! 128K Cache, 130MB Drive, 4MB Memory and More. Ready to ship today!

'386-33 ONLY $2795.
As a '486-33 ONLY $3095!

- Upgradable CPU module allows you to change processors as your computing needs change!
- Ultra high speed Zero-Wait *128K* SRAM Cache.
- 4MB of Zero-Wait 53ns DRAM, expandable to a Total of 32MB on the motherboard.
- Ultra Fast 130MB IDE Hard Drive.
- 1.2MB and 1.44MB Teac® floppies.
- ZEOS 14" High Res 1024x768 VGA Color Monitor with Tilt/Swivel base.
- High Speed 16-bit Diamond SpeedStar Plus VGA 1024 color graphics card with 1MB RAM!
- Lotus 1-2-3 for Windows, *plus* Ami Pro 2.0, *plus* Microsoft Windows and DOS 5.0, *plus* a genuine Microsoft mouse!
- Shadow RAM and EMS support for enhanced performance.
- ZEOS/RS 101 key SpaceSaver keyboard.
- High Speed ZEOS I/O with two Serial, one Parallel & one Game Port built in.
- 7-16, 1-8 bit expansion slots. Math coprocessor support for '386.
- Rugged ZEOS SpaceSaver Case with two cooling fans for added reliability and product life.
- Seven drive bays and our custom 300 Watt power supply for your future expansion.
- Includes ZEOS 24 Hour a Day Toll Free Technical Support and Customer Satisfaction package.

***OUR GUARANTEE TO YOU:**

If we accept your order for immediate shipment and fail to ship your system under the conditions outlined, we will ship it at *our expense* as soon as it is ready.

This offer is good only as long as these pre-built systems remain in stock; please give us a call to verify availability. This offer does not apply to other ZEOS systems or custom configurations.

IMMEDIATE SHIPMENT IS ONLY PART OF THE STORY.

These are not just any computer systems. They're the high performance, high quality ZEOS *upgradable* systems. Packing all the ZEOS value that has won PC Magazine Editor's Choice—*eight times!*

So why not give us a call right now. If we hear from you by 1:00 this afternoon, we'll get your new system on the way to you today! Call now Toll Free 800-423-5891.

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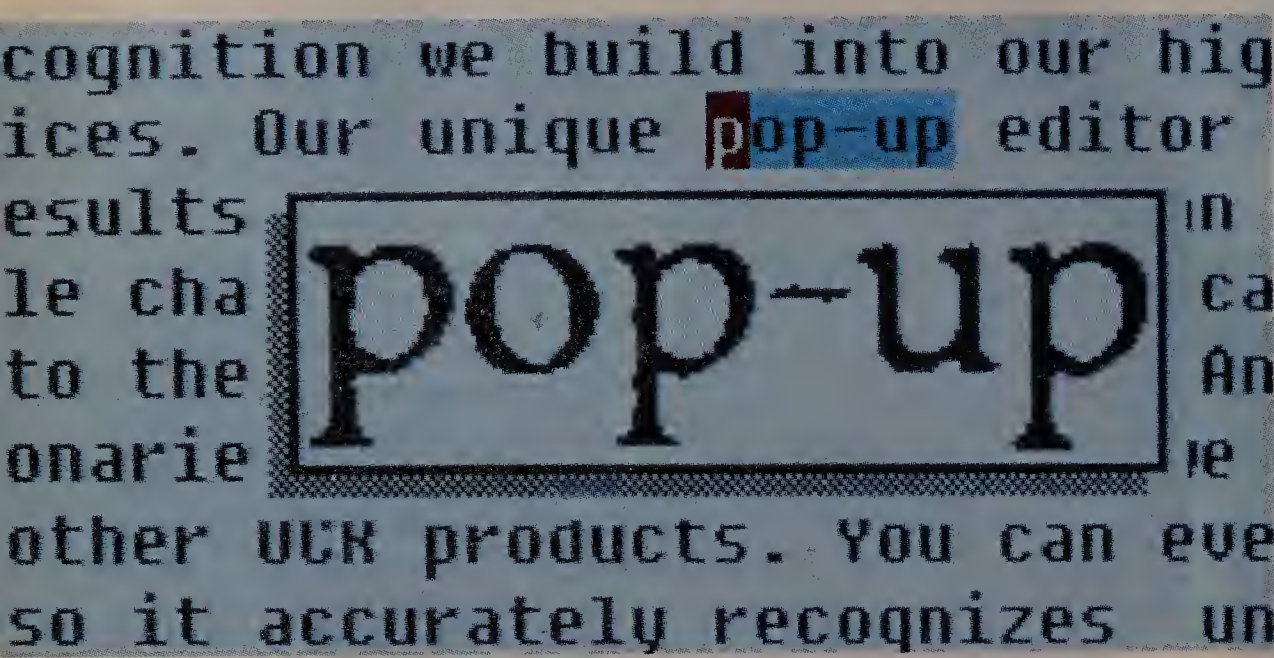

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—PC MAGAZINE

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Circle 47 on reader service card

40-MHz 386 Systems: As Fast as They Come

Two early systems built around AMD's hot 386 clone are not only faster than their 486SX competition—they can run with some 25-MHz 486DX machines!

Turning 40 never felt this good before: Two new machines, the Arche Master 386-40 and the Club Falcon 340, are speedy yet reasonably priced systems based on AMD's 40-MHz chip.

LUIS DELGADO

Robert Lauriston

In the five years since it introduced the 386 chip, Intel has kept the high end of the PC market—and lately the middle, too—all to itself. That has translated into high profits for Intel and high prices for the rest of us.

But once again Intel faces serious competition, and from a familiar adversary: Advanced Micro Devices. AMD, a longtime producer of Intel-licensed 286 chips, has finally made good on its promise to clone the 386. AMD's first attempt, the Am386DX-40, looks like a winner.

The first test of any clone is compatibility, and the Am386 seems to pass with flying colors. This makes sense, as the chip is only partially a clone. While the hardware design is an AMD original, the microcode (built-in software) is the same as that in Intel's 386 chips. (The two companies are currently in court debating whether the license AMD bought from Intel applies to the 386.) Neither we nor the manufacturers we interviewed have encountered any problems with the AMD chip.

Compatibility assured, the other key factor in a CPU is speed—and the Am386 delivers performance aplenty. *PC World* tested two of the first systems built around the new chip. And as you'd expect, they show that the 40-MHz 386 systems outrun their 33-MHz Intel counterparts. Surprisingly, they also speed past systems based on Intel's supposed AMD killer, the 20-MHz 486SX, and on some tests proved to be faster than 25-MHz 486DX systems.

The Am386's price/performance ratio is also attractive. Vendors say AMD's aggressive pricing lets them sell 40-MHz 386 systems for slightly less than those based on the 20-MHz 486SX. For example, Northgate, which sells both systems, charges $100 less for its 40-MHz 386. Here's a look at two other early Am386 arrivals from Arche and Club American.

Arche Master 386-40

In our performance tests, the Arche showed just how fast a

SNAPSHOT

40-MHz Am386 —Speed on a Budget

Inexpensive 40-MHz Am386 systems run demanding applications 15 to 20 percent faster than Intel's 33-MHz 386s or 20-MHz 486SXs.

Arche Master 386-40

KEY FEATURES

- **128K RAM cache**
- **Caching IDE disk controller with 512K RAM, upgradable to 16MB**
- **Two years on-site service**

AVAILABILITY

Immediate

PRICING

With 4MB RAM, 120MB hard disk, color super-VGA monitor, DOS 5.0, Windows, and mouse $4918; 200MB IDE drive $340; 338MB ESDI drive $1530; 400MB IDE drive $1620; math coprocessor $299

Arche Technologies
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Fremont, CA 94538
800/437-1686,
415/683-6754 (fax)

Reader service no. 699

(continues)

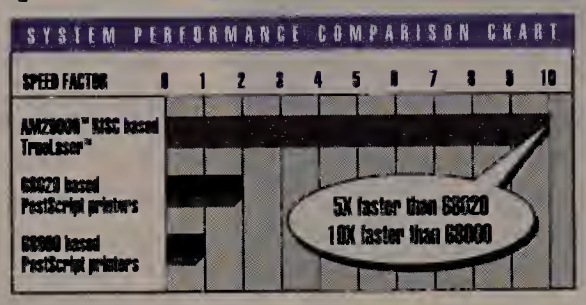
TrueLaser™

"Fastest overall printer..."

InfoWorld PostScript Printer comparison, June 10, 1991.

The Power of RISC.

The TrueLaser printer uses the powerful AMD 29000, 32-bit RISC processor. This powerful micro-processor gives TrueLaser the ability to process your graphics and text files many times faster than conventional PostScript printers, greatly reducing your wait time and increasing your productivity.



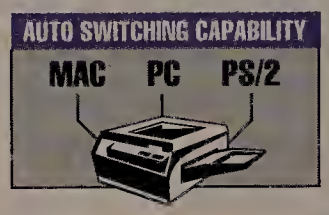
TrueType and PostScript Fonts.

The TrueLaser printer comes bundled with 35 TrueType fonts, Apple's new font standard, which gives you high quality output in even the smallest point sizes. TrueLaser is also compatible with all of Adobe's Type 1 and Type 3 fonts.

Versatile.

TrueLaser works in just about any computing environment–Macintosh, IBM PC, or PS/2. It comes standard with the three most popular interfaces: AppleTalk, Centronics, and RS-232C. And because TrueLaser includes built-in automatic interface switching, sharing the TrueLaser is a snap.

TrueLaser also provides HP PCL and PostScript compatibility which is specially optimizes for greater speed when using Microsoft Windows.



Affordable.

TrueLaser gives you everything you need to produce stunning text and graphics output in half the time, along with a 1 year warranty that includes 6 months of on-site service. For only $2695, you can get it all.

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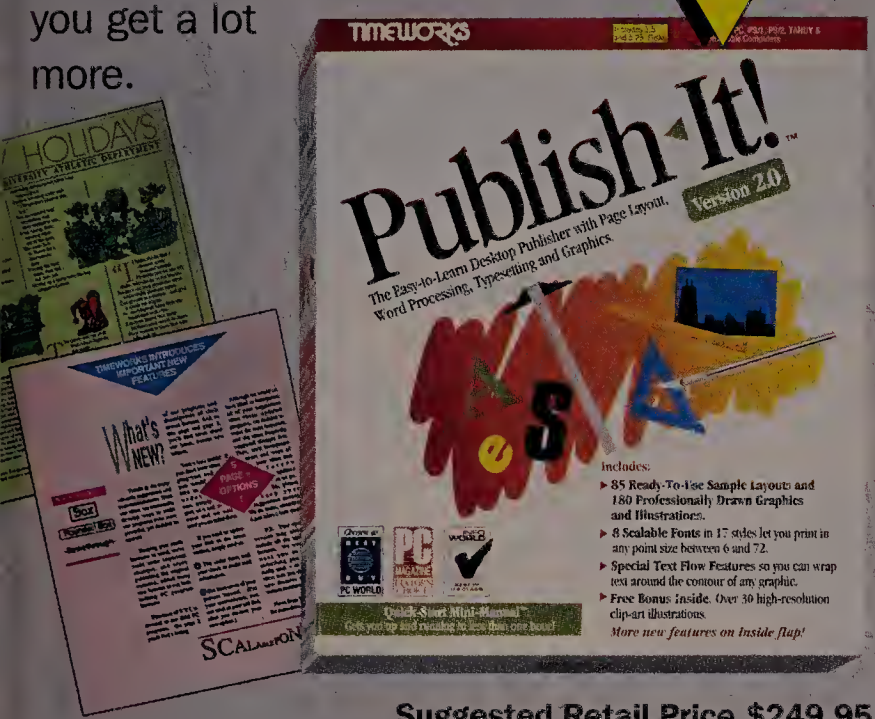

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(continued)

Club Falcon 340

KEY FEATURES

- **64K RAM cache upgradable to 256K**
- **Easy upgrade to 33-MHz 486**
- **Sturdy tower case**

AVAILABILITY

Immediate

PRICING

With 4MB RAM, 100MB hard disk, color super-VGA monitor, DOS 5.0, Windows, mouse, and tower case $2695; with desktop case $2595; 330MB drive $825; 650MB drive $1025; math coprocessor $300; upgrade to 33-MHz 486 $650 plus old CPU board

Club American Technologies
3401 W. Warren Ave.
Fremont, CA 94539
415/683-6688,
415/490-2687 (fax)

Reader service no. 700

40-MHz 386 can be. It ran *WordPerfect* as fast as a 25-MHz 486, and came close to 486 performance on *AutoCAD* as well. With the help of its caching IDE controller (standard equipment), the Arche tore through our *Paradox* test (not shown) in 391 seconds—almost as fast as the Compaq 486/33L.

Apart from its zippy CPU and caching controller, the Arche follows conventional AT design. The motherboard comes standard with 4MB RAM, upgradable to 32MB, and you can plug in your choice of math coprocessors from Cyrix or Weitek. (Naturally Intel doesn't make a 40-MHz 80387.)

You also get a choice of full-sized or reduced-footprint cases. The full-sized case boasts five free 16-bit slots and five half-height drive bays, three of them externally accessible. The smaller case has the same number of slots but only the three externally accessible drive bays.

As with all Arche systems, two years of on-site service is included in the Master 386-40's $4918 list price. Arche also plans to ship the Legacy 386-40 shortly. The Legacy is similar to the Master, with a slimmer price and no caching controller.

Club Falcon 340

With a list price of $2695, the Club Falcon 340 shows just how inexpensive 40-MHz 386 power can be. It packs plenty of performance, though—while not quite as fast overall as the Arche, it's close. The Club's big advantage is its easy CPU upgrade path: Turning the system into a 33-MHz 486 requires only a screwdriver and a quick CPU-board swap, and it costs only $650 after a $500 credit if you return the old CPU.

Club is clearly aiming the Falcon 340 at the network server market. The system's hefty tower case has room for nine half-height drives. You get four free 16-bit slots and can install 64MB RAM on the motherboard. There's also a reduced-footprint version with the same board and RAM capacity but only four drive bays.

Club sells through dealers as Club American and by mail as Club Computer Systems with the same list prices. In either case, it comes with one year of on-site service.

The AMD Inside

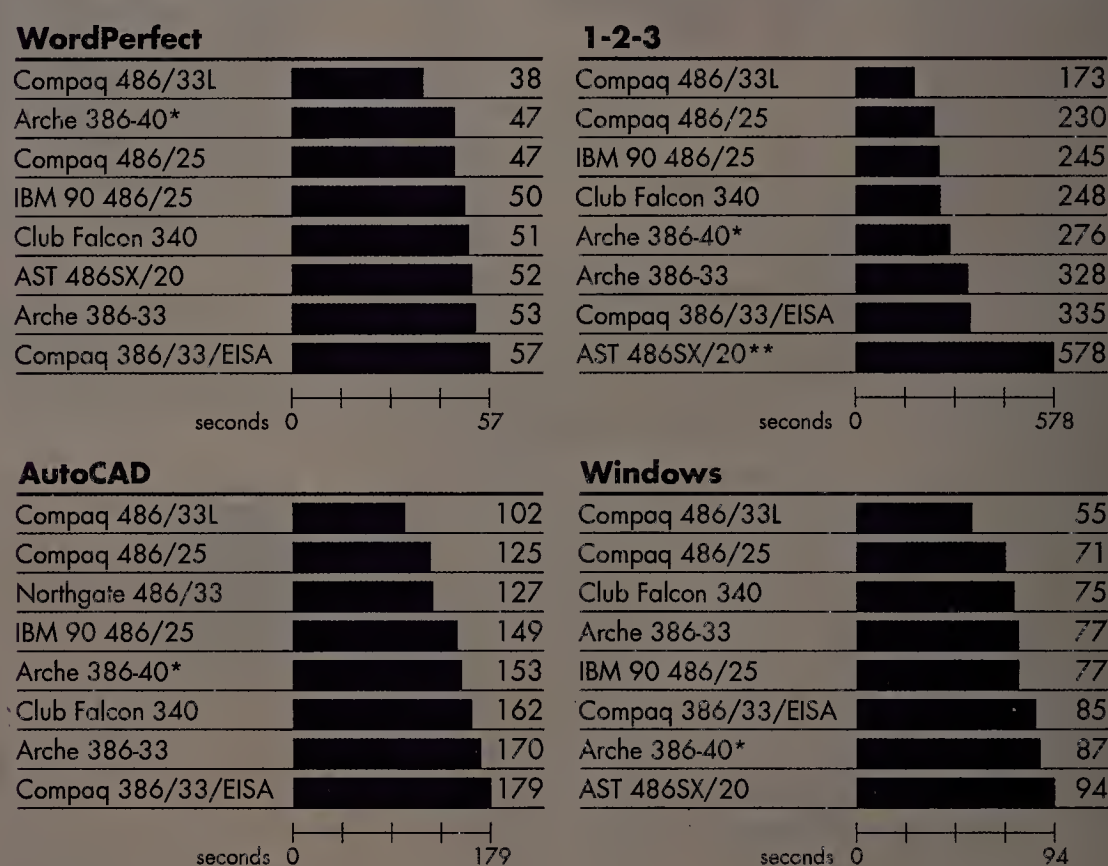
Don't expect every vendor to deliver systems based on the AMD 40-MHz chip—Intel's influence is too pervasive. But AMD's competition in the CPU market should bring lower prices to every desktop, even those that cleave to Intel chips. AMD's second salvo, a low-power 25-MHz Am386-SXL for laptops, should soon take the show on the road. And AMD plans to push 386 technology as far as it will go.

Robert Lauriston is a contributing editor for PC World.

PC WORLD TEST REPORT

AMD Challenges Intel's Top Spot

Arche and Club Falcon systems based on AMD's 40-MHz 386 outgun systems built around Intel's 33-MHz 386 and 20-MHz 486SX—and they do it for less.



*Tested with a 512K hardware disk cache.
**Tested without a math coprocessor.

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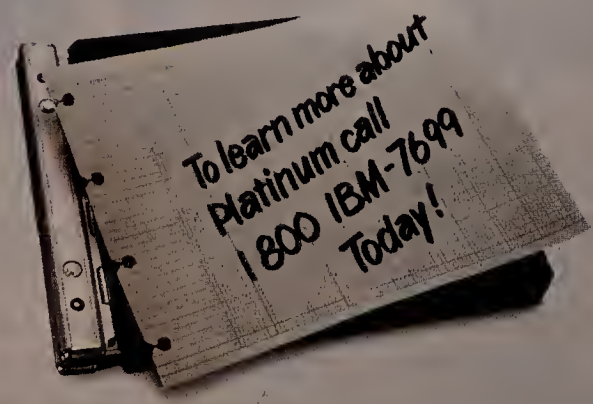

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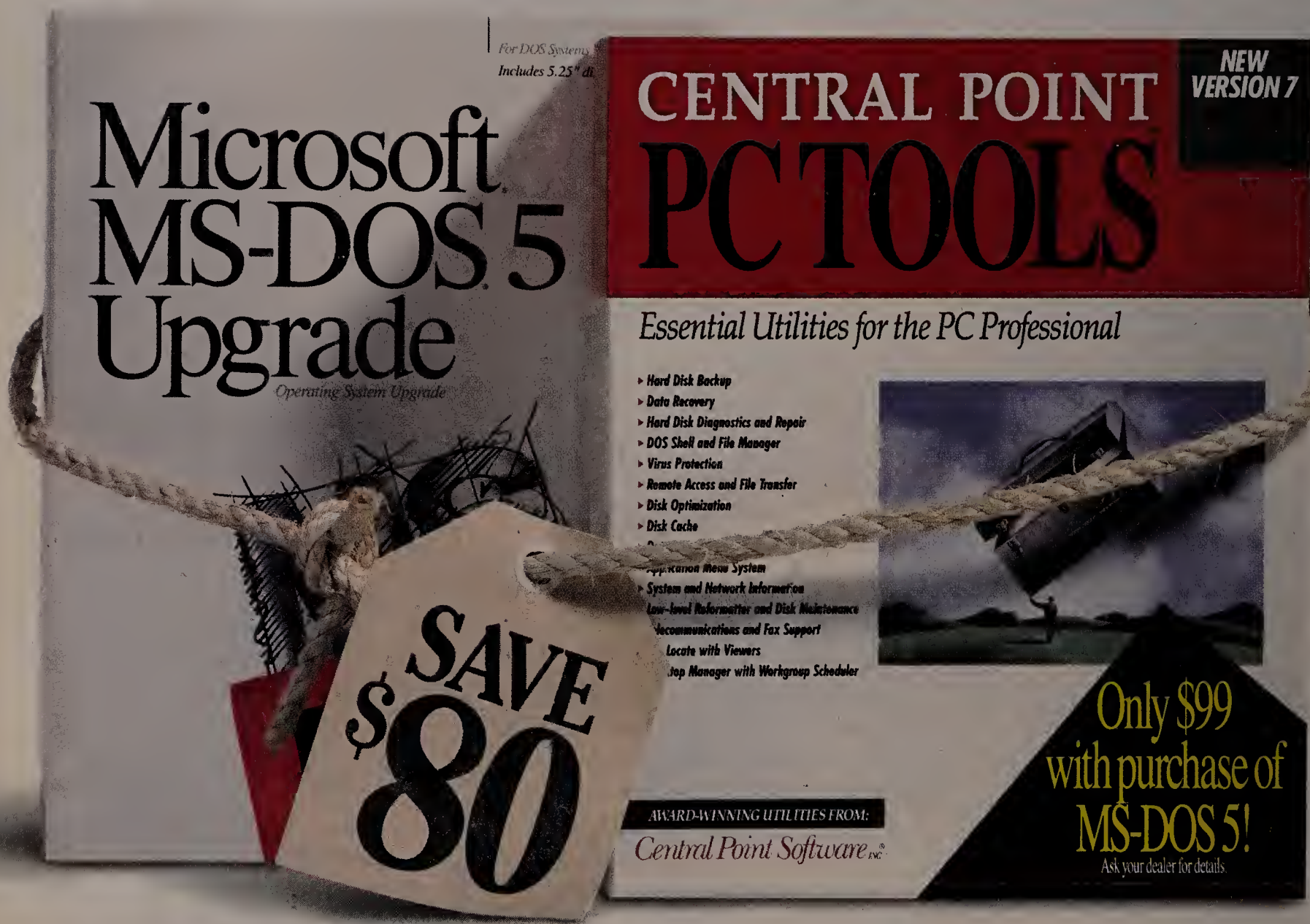

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Circle 52 on reader service card

Ventura Turns Color

Ventura's new color features will make a big splash with graphic artists, but business users may hunger for more.

Ventura Publisher 4.0's new color extensions let you scan 24-bit color images, retouch them, and create color separations without leaving the program.

Jesse Berst

Color desktop publishing on the PC is still just a blip on the horizon, but Ventura Software will help usher it in. *Ventura Publisher Windows Edition 4.0* offers professional color capabilities and some sorely needed editing tools.

But while graphics professionals may be satisfied by the color additions, business users will likely want more. *Ventura 4.0* still has a nonstandard *Windows* interface and minimal drawing tools. It's also missing some of the niceties found in *PageMaker 4.0*, such as a full-featured text editor and a pasteboard where you can stash your pictures and text before placing them on the page.

Search and Spell

Everyday users will be happiest about *4.0*'s new editing functions. You can finally check spelling within *Ventura* and search for and replace text, fonts, attributes (bold, italic), and style tags. And *Ventura* now accepts *Word for Windows* files directly—no more hassles converting your text files to a DOS format.

Version 4.0 also lets you import objects such as charts and drawings and hot link them to other *Windows* applications. Double-click on an *Excel* chart inside *Ventura*, and *Windows* launches the spreadsheet. After you change the data in *Excel*, the chart is updated automatically in your document.

Unfortunately, *4.0* hasn't achieved full *Windows* citizenship. It retains the keyboard shortcuts and dialog boxes found in its *GEM* predecessor—an awkward compromise that's likely to satisfy neither *GEM* veterans nor *Windows* stalwarts.

Primary Colors

Ventura comes well equipped for adding color to desktop documents. Version 4.0 supports 24-bit color images and lets you specify CMYK, Pantone, and other major color standards.

But for professional color production, you'll need to invest in *4.0*'s color extensions. Developed by Pre-Press Technologies, these programs let you scan images, edit them, and create color separations, all without leaving *Ventura*. Prices are $395 for the scan module, $495 for the low-end color separator, and $3995 for the high-end separator. (A $795 image editor won't be available until early 1992.) These add-in modules point to a future where you can select from a library of extensions for specialized needs.

For longtime users, the spelling checker and search functions alone are reason enough to upgrade. Ventura also claims *4.0* fixes *3.0*'s bugs and incompatibilities. But if you're looking for the ultimate *Ventura* upgrade, keep your eyes on the horizon.

Jesse Berst is co-author of Inside Windows Guides: Ventura Publisher *(Microsoft Press, Redmond, Washington, 1991) and a contributing editor for* PC World.

SNAPSHOT

Ventura Publisher Windows Edition 4.0

WINDOWS The long-document workhorse gains some sorely needed editing tools and hooks to optional color extensions.

KEY FEATURES

- **Built-in spelling checker**
- **Searches and replaces text, fonts, and tags**
- **Support for 24-bit color images**
- **Full integration with extra-cost scanning, retouching, and color separation modules**

AVAILABILITY

Fourth quarter 1991

PRICING

$795, upgrade from 3.0 $129

Ventura Software
15175 Innovation Dr.
San Diego, CA 92128
800/822-8221

Reader service no. 698

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rooom.

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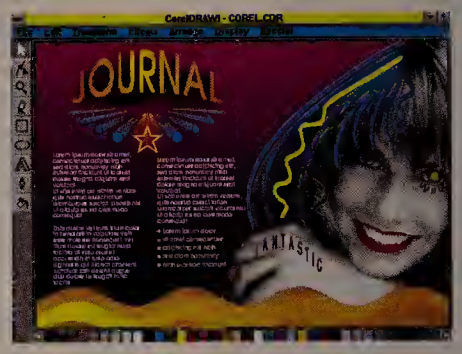

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PRODUCT OUTLOOK

Edited by MIKE HOGAN

HP ScanJet IIc

Customized Color Scans in an Off-the-Rack World

The ScanJet Plus adds a flashy 16 million colors and 400-dpi scanning to its 256 shades of gray, and sophisticated controls let you customize images once you've got 'em.

Hewlett-Packard's once-fashionable ScanJet Plus is throwing off its gray-scale tweeds for a flashy color sport coat and a madras tie. If you need to dress up your documents and presentations with full-color images, the ScanJet IIc is a perfect fit.

Like Epson's 300C and Microtek's 300G/Z, the ScanJet IIc captures 256 shades of gray or up to 16 million colors. But unlike its 300-dpi rivals, the $2195 IIc scans at up to 400 dpi and adds sophisticated scanning controls for customizing your images.

The IIc's *Windows 3.0*–based software lets you do a fast, low-resolution preview scan, adjusting brightness and contrast for all or part of a picture and converting images then and there to black and white or spot color. You can calibrate the scanner to match the output on your color printer or emphasize specific tints—for example, pumping up the yellow to make it look like a picture was taken at sunset. And you get to view your changes on screen before performing the final scan.

You can tailor the ScanJet's settings to suit your output device—scanning at one resolution and color tint for your screen, another for 35mm slides, and a third for the office laser—then store them for later use. If you need to retouch images, ZSoft's *Publisher's Paintbrush 2.0* is bundled in.

The IIc uses a single-pass scan engine and a single light source for faster scans and better alignment of color dots. HP claims the IIc will scan a 300-dpi full-color image in 20 seconds—significantly faster than competing scanners.

At 400 dpi, the ScanJet promises sharper output of line art on high-resolution devices and more accurate text recognition with programs such as HP's $595 *AccuScan*. The IIc handles plain and glossy originals up to 8½ by 14 inches and comes with a one-year warranty. A 50-page automatic document feeder will be $695.—*Daniel Tynan*

IN BRIEF

HP ScanJet IIc
WINDOWS Cut from a different cloth, HP's $2195 color scanner regales you with fast, 400-dpi performance and elegant custom scan settings.
Hewlett-Packard
19310 Pruneridge Ave.
Cupertino, CA 95014
800/752-0900
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INSIDE PRODUCT OUTLOOK

102 **Lantastic 4.0, Lantastic for Windows, Lantastic for NetWare** This peer-to-peer network operating system becomes faster and safer and now comes in *Windows* and NetWare versions.

102 **Fonts-on-the-Fly** Now you have access to a collection of scalable fonts in *WordPerfect*.

104 **PN48** Portable printer is small on size and weight, big on quality.

104 **microLaser XL Turbo** Get fast PostScript output for your work group.

108 **LQ-570, LQ-870, LQ-1170** Epson's three new 24-pin dot matrix printers are the first ones to handle scalable fonts.

108 **HL-8V** Brother's alternative to the Hewlett-Packard LaserJet III boasts faster printing and delivers more fonts.

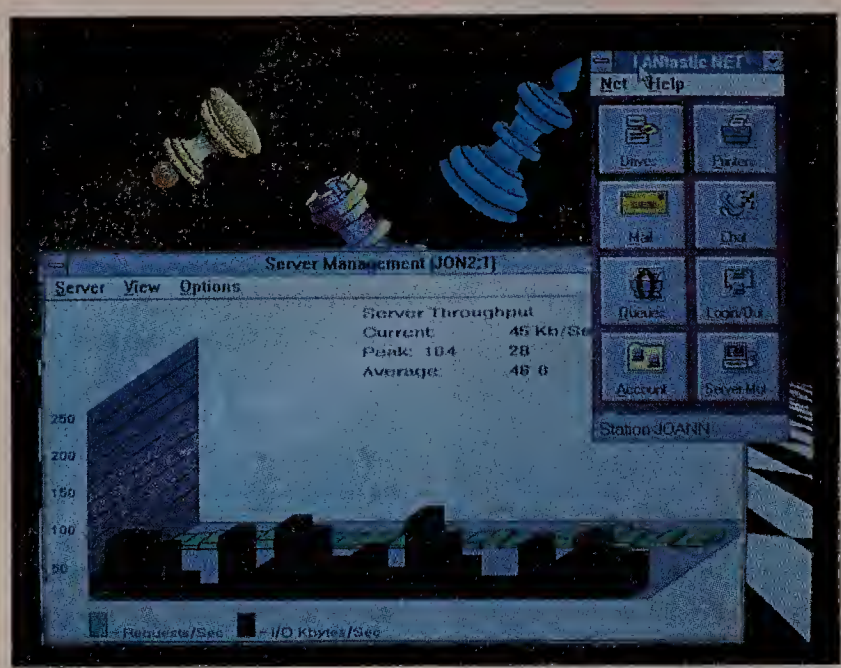
110 **ALQ224GX, ALQ324GX** These dot matrix printers provide cheap color and multipart forms printing.

116 **FontBank Cartridge** Put your own collection of most-often-used fonts within easy reach.

120 **Safari NSX/20** AT&T's notebook PC is elegant outside and tough inside: It's a true desktop equivalent that gives more computing time than most.

Lantastic 4.0, Lantastic for Windows, Lantastic for NetWare

Peer-to-Peer LAN Champ Meets Windows, NetWare



Artisoft's Best Buy peer-to-peer LAN just got faster, it works within Windows, and it shuts down more safely when the lights go out.

Lantastic 4.0, the latest upgrade to the Best Buy (November 1989) peer-to-peer network operating system (NOS), promises higher speed, tighter security, and some new tricks. For a few dollars more, you can even get a full *Windows* interface and/or a version of *Lantastic* that adds peer-to-peer file and improved printer sharing to NetWare.

Windows users will be gratified to know that *Lantastic 4.0* ends the NOS's conflicts with *Windows*' 386-enhanced mode, so you can take advantage of both programs. Artisoft also claims improved performance and provides a Net Run command that lets you start batch files on other workstations. For example, you might copy a large data base to another PC, then use its CPU to generate a lengthy report.

Version 4.0's NetWare-style use of an uninterruptible power supply results in better data security through an orderly shutdown of all files on the server and coordination with all logged-on workstations.

An optional interface, *Lantastic for Windows*, gives users and administrators all the advantages of the environment, replacing the usual command-line interface and character-mode utilities with pull-down menus and dialog boxes. Multiple windows let you monitor a print queue in one while you switch to a new remote drive in another.

Meanwhile, *Lantastic for NetWare* integrates *Lantastic*'s peer-to-peer talents with NetWare's peerless dedicated-server power. You can share workstation drives with other PCs on a NetWare LAN and attach up to five network printers to each PC. You also get *Lantastic*'s chat utility—not quite E-mail, but quite serviceable. One minor drawback is that unlike most peer-to-peer NetWare add-ons, *Lantastic* makes you load NetWare's NETBIOS emulator on top of its IPX drivers.

Lantastic 4.0 costs $99 per user or $2499 for 300 users; upgrades from earlier releases are $99 per network. Bundled with NE2000-compatible Ethernet boards, it costs $699 for the first two stations, plus $299 for each additional board; with Artisoft's network boards, it's $499 for the first two and $199 for each additional. For current *Lantastic* owners, upgrades are $50 or $99 per network, depending on board type. *Lantastic for Windows* costs $299 per network, while *Lantastic for NetWare* is $499 per network. —*Robert Lauriston*

IN BRIEF

Lantastic 4.0, Lantastic for Windows, Lantastic for NetWare
WINDOWS A faster, safer version of this Best Buy network OS offers an optional Windows interface and adds flexibility to NetWare LANs.
Artisoft, Inc.
Artisoft Plaza
575 E. River Rd.
Tucson, AZ 85704
602/293-6363,
602/293-8065 (fax)
Reader service no. 673

Fonts-on-the-Fly

Scaling Font Heights in WordPerfect

Dyed-in-the-wool *WordPerfect* users needn't wait for the *Windows* version to gain access to scalable fonts. *Fonts-on-the-Fly* from LaserTools brings a generous selection of scalable soft fonts to *WordPerfect 5.0* and later.

This $149 utility offers 19 typefaces from seven type families, scalable from 0.25 to 250 points. You won't find Dom Casual or other specialty fonts; rather, you get the widely used Times Roman, Helvetica, and Courier equivalents, as well as a condensed version of Helvetica and a full array of Garamond fonts.

You can access fonts from *WordPerfect*'s menus in the usual way, or you can use *Fonts-on-the-Fly*'s shortcut keys, which make character formatting easier than it is with *WordPerfect*'s key commands. For example, italicizing text is simply a matter of hitting <Ctrl>-I, instead of three keystrokes in *WordPerfect:* <Ctrl>-<F8>, A (for Appearance), I (for Italic).

Fonts-on-the-Fly outputs to the entire array of Hewlett-Packard–compatible laser printers plus a wide variety of dot matrix and ink jet printers. An added plus: the documents it produces retain formatting and printed layout regardless of the printer used. It's also fully network compatible.

Fonts-on-the-Fly can work under the standard 512K of memory that comes with HP LaserJets, but LaserTools recommends a full megabyte. The program is hungry for disk space, requiring 3MB for the scalable typefaces. Those using dot matrix or ink jet printers will need to keep an additional 1½MB of disk space free for *Fonts-on-the-Fly* buffer files. —*Patrick Marshall*

IN BRIEF

Fonts-on-the-Fly
This utility gives WordPerfect easy-to-use scalable fonts.
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So for the price of a 24-pin dot matrix, you can now get printers that are better for your image and for your ears. The Canon Bubble Jet printers.

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Circle 50 on reader service card

PN48

Lose the Weight; Gain Print Quality

The advent of portable printers means your office can be anywhere you are at any time. Citizen makes it even easier with its 2½-pound printer—it's 2 pounds less than its nearest competitor and several pounds lighter than most portable printers. With dimensions of 11.7 by 3½ by 2 inches, the PN48 is also less bulky than other portables, letting you easily squeeze it into half your briefcase or place it on a small corner of your desk.

But the PN48's size and weight don't mean you have to give up features or print quality. Using thermal fusion—a process of heating ink and pressing it dry onto the page—the PN48 prints a page of text a minute with a graph at 360 dpi. Your letter quality documents can include eight font variations from the Courier and Times Roman typeface families, with seven character pitches between 2.8 and 20 points on any type of paper—transparencies, cut sheets, letterhead, legal, and envelopes. A mere 4K buffer limits the number of fonts you can use at any one time, though.

The battery-powered PN48 has a straight paper path that uses friction to feed paper a page at a time through a slot at the rear and out a slot at the front. No matter what kind of paper you use, you can print up to 25 pages on a single battery charge (it takes around 3½ hours to recharge). This quiet printer can even help out at meetings.

For an extra $20, Citizen's warranty lets you dial an 800 number 24 hours a day and have a new printer immediately sent to you anywhere in the world. This is a particularly good idea because small peripherals generally have lesser mean-time-between-failure rates. At $549, the PN48 is a little more expensive than its peers, but its convenience and quality make it well worth the extra cost. —*Susan Lusty*

IN BRIEF

PN48
This 2½-pound, battery-powered printer can take you a long way, quietly printing one letter-quality document per minute.
Citizen America Corp.
2450 Broadway #600
Santa Monica, CA
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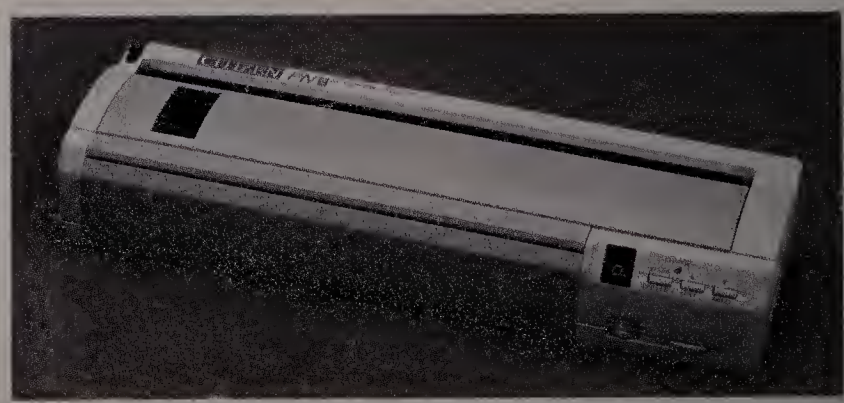
213/453-2814 (fax)
Reader service no. 685



At 2½ pounds, the PN48 may be the lightest battery-powered portable printer around, and you still get quality graphics, good paper handling, and plenty of font choices.

microLaser XL Turbo

High-Speed Network-Ready Printer

Like most first-generation lasers pitched as shared-resource PostScript printers, the TI microLaser XL tripped over graphics processing. But where the old microLaser fell down, the new 16-ppm microLaser XL Turbo stands tall.

The biggest addition is a 16-MHz Weitek RISC coprocessor that slices through PostScript jobs in about a third the time required by single-processor printers based on the Motorola 68020. A Motorola 68000 main processor is still there to handle I/O and volume HP PCL 4 text printing. The new TI also ships with 35 PostScript fonts and Level 2 enhancements such as font switching, caching, and compressed-images transmission.

Dual-mode printing is a snap. You can send either PostScript or HP PCL 4 files without having to manually reset or send escape codes. The printer detects and switches modes on its own—something even the standard-setting HP LaserJet IIISi doesn't do.

Overall, the microLaser is about $1300 cheaper and about 50 pounds lighter than the 108-pound IIISi but a page per minute slower. While TI improved microLaser connectivity by including a standard parallel port to hook to a print server or black box network connector, it still lacks the IIISi's high-speed ethernet option.

You can add a $49 serial port, a $145 serial and AppleTalk port combo, or a three-way serial/AppleTalk/SCSI port for $350. In multiport configurations, the printer polls available ports on a first-in-first-out basis.

Paper capacity lags behind the IIISi's two 500-sheet bins and other paper-handling niceties but should be ample for a work group of up to eight people. A 250-sheet internal letter/legal-sized input paper drawer comes standard. Underneath you can add a second 500-sheet letter or legal bin for $495. You can also install a $495 70-envelope feeder there. With software-controlled remote bin changing, you can print a cover sheet on letterhead, print inside pages on plain bond, then address the envelope—without ever leaving your desk.

You get 2MB of memory on the PostScript processor board and half a megabyte on the main controller board. You can boost that by adding a healthy 6MB on the PostScript board and 4½MB on the main board for HP PCL 4 jobs. The microLaser XL Turbo is $5199. You can upgrade older microLaser printers with a $1750 PostScript kit that includes the RISC processor. —*Mark Henricks*

IN BRIEF

microLaser XL Turbo
This 16-ppm laser's RISC-based graphics coprocessor and automatic emulation switching can easily keep a small work group printing.
Texas Instruments Inc.
Information Technology Group
P.O. Box 202230,
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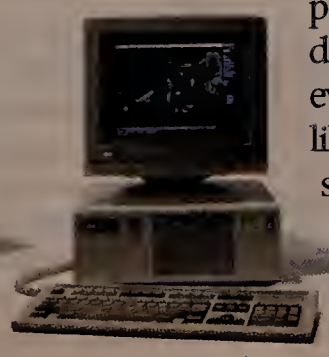

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Circle 10 on reader service card

LQ-570, LQ-870, LQ-1170

Epson Dot Matrix Workhorses Carry Scalable Fonts

Epson's new printer control language, ESC/P2, improves the quality of graphics and brings 8- to 32-point scaling of two typefaces to the wide-carriage, 24-pin dot matrix LQ-1170.

Are you looking for scalable fonts on a dot matrix printer? Epson has developed a new printer control language, ESC/P 2, that brings limited font scaling to a trio of new 24-pin dot matrix printers—a technology it will add to all new releases.

The narrow-carriage personal printer, the LQ-570, and the business workhorses, the LQ-870 and the wide-carriage LQ-1170, offer fonts that are scalable between a fairly wide range: 8 to 32 points for two typefaces. In addition, ESC/P 2 offers an enhanced graphics mode that improves dot placement at 360 dpi.

Backward compatibility with Epson's ESC/P standard is assured, and the following packages have drivers to take advantage of ESC/P 2: all post-*5.1* versions of *WordPerfect, PlanPerfect,* and *DrawPerfect,* as well as *LetterPerfect 1.0, Word 5.5, WordStar 6,* and *Windows 3.0.*

All three units come with an 8K input buffer, a draft font, nine bit-mapped fonts—including standbys Courier and Prestige—and roman and sans serif scalable fonts.

The $499 LQ-570 replaces the LQ-510, boosting print speed 30 percent to a maximum draft speed of 315 characters per second (cps). It will also print in letter-quality mode, at 10 characters per inch (cpi) at 70 cps.

The $749 LQ-870 and $1049 LQ-1170 are narrow- and wide-carriage replacements, respectively, for the LQ-850 and LQ-1050, with a 12 percent speed increase to a draft-quality maximum of 413 cps. Both machines print in letter-quality mode at 92 cps.

The trio includes easily accessible front-panel controls and several paper-handling improvements. A convertible push-pull tractor lets continuous paper, forms, or labels be loaded from the standard rear-push position, but it can be converted to a pull tractor that loads from the bottom. It's also possible to feed single sheets from the front or from a top paper path.

A standard cut-sheet feeder holds up to 50 sheets of paper, while a high-capacity option can hold 150 sheets or 25 envelopes. You can load both to alternate between letterhead and plain stock or envelopes. —*Mike Hogan*

IN BRIEF

LQ-570, LQ-870, LQ-1170
This 24-pin trio introduces scalable fonts to the dot matrix world and offers a stack of paper-handling improvements.
Epson America, Inc.
20770 Madrona Ave.
Torrance, CA
90509-2842
800/922-8911
Reader service no. 679

HL-8V

More Than a Clone of the LaserJet III

Brother International has beaten its fellow laser printer makers to market with the first clone of the Hewlett-Packard LaserJet III with PCL 5 and a variant of HP's patented Resolution Enhancement technology (RET). With even more chutzpah, Brother has slapped a $2495 price tag on the HL-8V—about $100 more than list price for the standard-setting III.

It costs more because it's better, says Brother. The HL-8V employs the same Canon LBP-SX 8-ppm engine as the III, but Brother's faster controller and proprietary data compression scheme squeezes out a speed advantage of 1 to 36 percent, depending on the print job.

That same data compression algorithm allows the printer to handle more fonts and graphics on a page than the HP printer, using the same amount of memory. Brother also claims the HL-8V can print larger fonts than the HP III in the same amount of memory.

The ability to display 64 shades of gray should give the HL-8V an edge in printing halftone images. Brother also offers 12 resident scalable fonts, compared with the HP III's 8, and tosses in 24 bit-mapped fonts as well.

Brother has even developed its own "high-resolution control" that the company claims equals the LaserJet III's RET at delivering near-600-dpi-quality characters on a 300-dpi machine. Actually, the LaserJet III provides smoother edges. Still, the difference is so slight that you probably won't notice it unless you're making transparencies for projection.

Added value or no, charging more money than the standard setter—particularly in the laser printer business—is a risky gambit. Depending on your locale, you may find even more than a $100 gap between the two printers because the III is widely distributed and more deeply discounted. You decide if the extra features are worth it. —*Patrick Marshall*

IN BRIEF

HL-8V
Brother hopes you'll pay a little more than you would for a LaserJet III to get faster printing, more fonts, and its brand of resolution enhancement.
Brother Int'l Corp.
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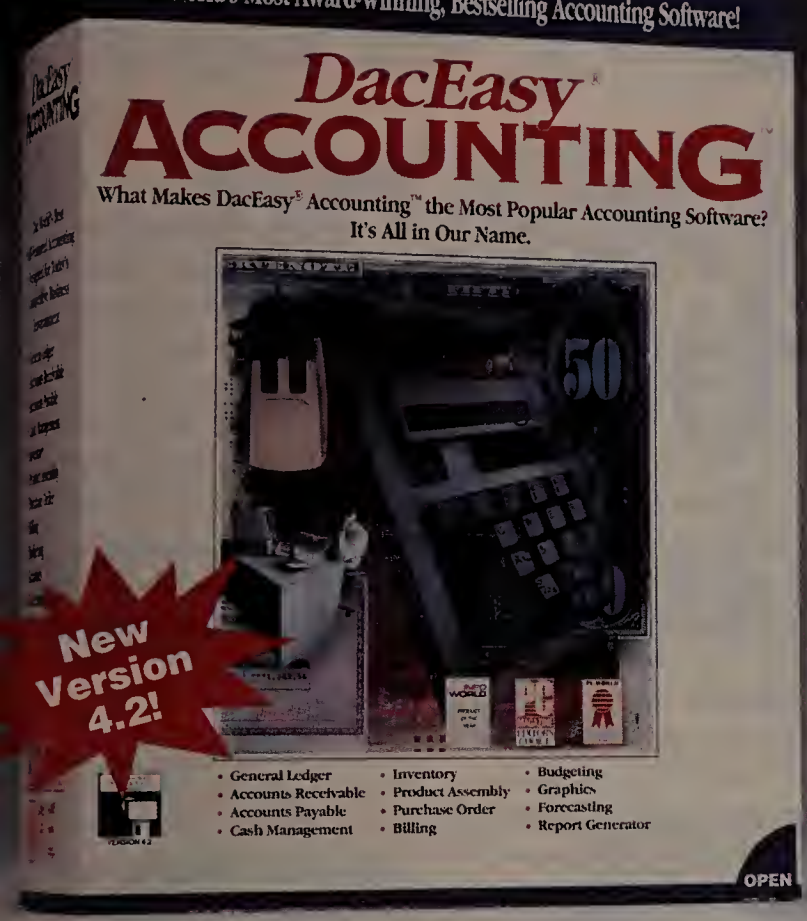

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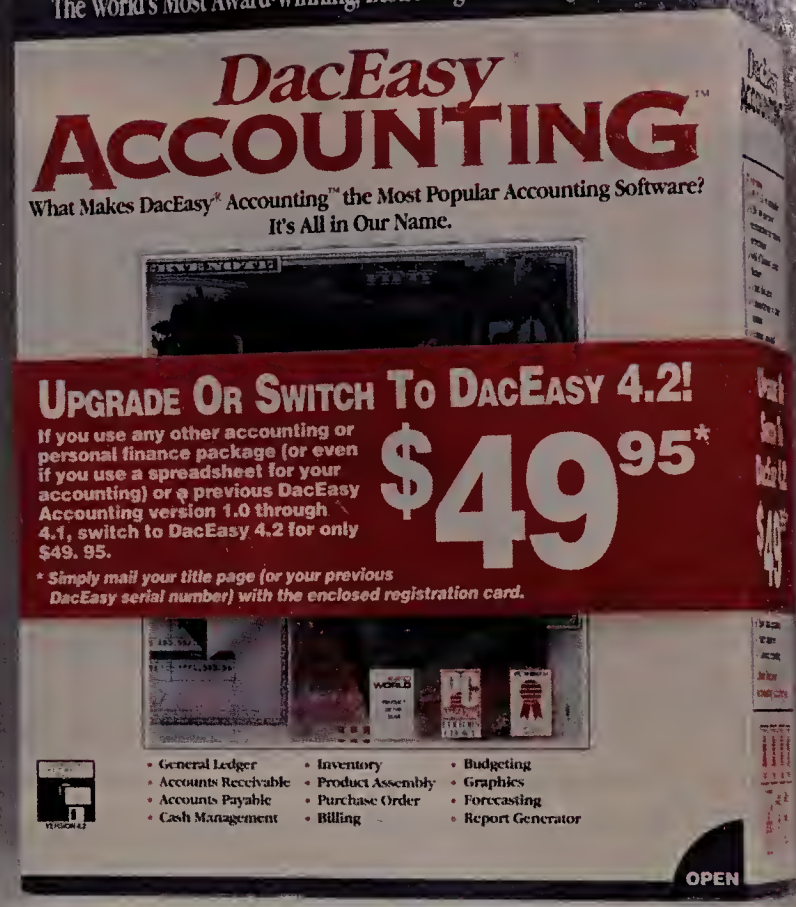

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Circle 94 on reader service card

ALQ224GX, ALQ324GX

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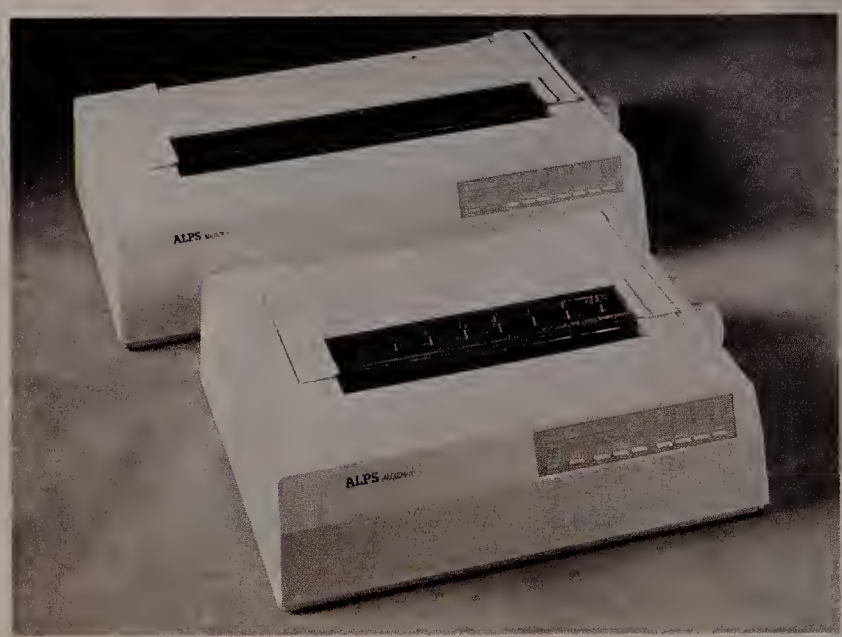

Narrow or wide carriage, these 24-pin printers let you add color cheaply, and they churn out multipart forms at a respectable clip.

They may not own the future, but as long as 24-pin dot matrix printers keep adding features and lowering prices, they continue to make sense, particularly for special applications such as multipart forms. The Alps ALQ224GX and its wide-carriage cousin, the ALQ324GX, offer an attractive combination of color capability, high durability, and low operating costs to let you economically add spot color to your financial reports, or graphics to your overhead transparencies—without sacrificing speed.

Both the $799 ALQ224GX and the $999 ALQ324GX pummel forms, labels, single sheets, fanfold, and even transparencies at draft speeds of up to 336 elite characters per second (cps). In letter quality mode, they put out 111 cps. Improved 360 by 360 resolution and this extra speed are just two of several significant enhancements the new models possess over the ALQ224E and ALQ324E models they replace. And you can still print your 9-pin graphics applications without aspect-ratio distortion—circles appear round, not oval.

A bidirectional tractor feed pushes and pulls simultaneously to reduce jams, while paper parking lets you easily mix print runs of single-sheet and fanfold paper. Another paper-handling nicety: The paper perforation is automatically aligned with the tear bar after a print job.

The front control panel lets you quickly select any of six resident (including five letter quality) fonts or the two optional fonts available with a font expansion board. Up to three custom configurations of pitch, font, form length, and other specifications can be saved as push-button macros. If you prefer, you can use the expansion slot to beef up the 23K print spool/downloaded character buffer with either a 64K or 256K memory board.

Both printers emulate Epson's LQ-2550 command set, including color, as well as subsets of Diablo 630 and 9-pin printer commands. Finally, these printers are built to withstand 7500 hours of operation, about half again as much as most in their class. —*Mark Henricks*

IN BRIEF

ALQ224GX, ALQ324GX
These dot matrix printers give you cheap color, multipart forms printing, and control features up front.
Alps America USA Inc.
3553 N. First St.
San Jose, CA
95134-1803
800/825-2577
Reader service no. 683

Pivot

Radius Focuses on the Big Picture

Full-page monitors have usually been regarded only as desktop publishing tools. But with today's increased use of graphical environments, all PC users can benefit from the loss of tedious scrolling and window resizing. The full-page Pivot from Radius is a 15-inch color monitor with a companion super-VGA adapter that lets you view applications the way they were meant to be viewed: portrait for word processing and landscape for spreadsheets.

Simply grab the corner of this $1245 monitor and rotate it 90 degrees to the appropriate position. The Pivot's software senses the monitor's orientation and reorganizes your desktop on the fly.

Also necessary for rotation is Radius's $445 SVGA MultiView interface card, which triggers a position-sensing device so that even screen pixels are put to their best use. You can run the monitor with another graphics card, but you'd miss out on the rotation software as well as on high-resolution, full-page drivers for applications like *Windows 3.0, WordPerfect 5.1, 1-2-3 2.2, AutoCAD* release 11 and other programs compatible with Video Seven VGA cards.

With 512K of built-in video memory, the MultiView card also supports resolutions of 800 by 600 with 256 colors and 1024 by 768 with 16 colors. To obtain 1024 by 768 with 256 colors or 640 by 480 with 32,768 colors, you need to add another 512K of memory, which costs $149.

Additionally, you'll see no unpleasant surprises at print time because the Pivot provides a WYSIWYG display of printer output. To help reduce eyestrain, Radius uses a flat display with square pixels at 0.28mm dot pitch and an antiglare screen. Versions of the MultiView card are available for ISA, MCA, and EISA-based PCs; both card and monitor handle refresh rates ranging from 60 to 107 Hz, depending on the resolution used. —*Susan Lusty*

IN BRIEF

Pivot
This full-page color display turns 90 degrees to show your spreadsheets in landscape mode and letters in portrait mode.
Radius Inc.
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San Jose, CA 95131
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Reader service no. 686

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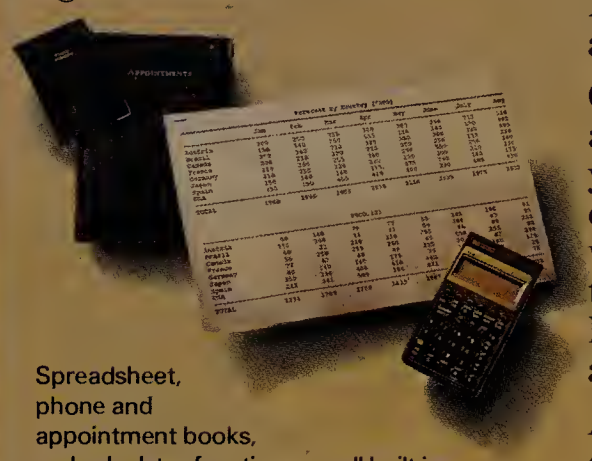

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Circle 90 on reader service card

OnTime for Windows

How the Desk Was Won

Setting up weekly schedules for yourself can be a tedious procedure, but doing it for your entire work group is like trying to herd cats through a dog show. *OnTime for Windows* takes a lot of the sweat out of time management with quick-access scheduling for you and members of your work group.

Unlike utility bundles, project managers, and most personal information managers (PIMs) with scheduling, *OnTime for Windows* achieves speed and ease of use by doing just one thing well—managing time. The package doesn't include calculators, critical-path charting, or data base indexing to slow you down.

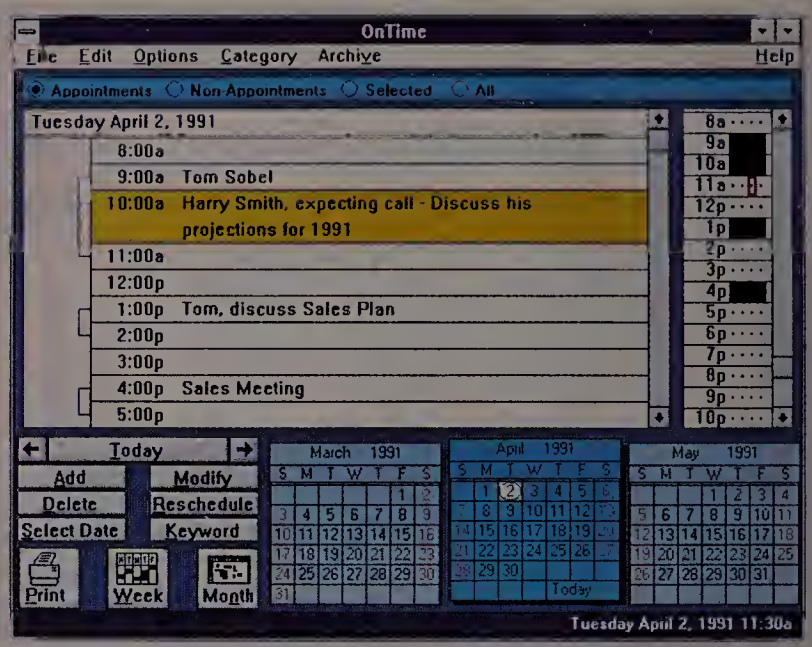
OnTime for Windows starts with a Day Planner, where you schedule appointment times, enter notes, and modify, rèschedule, or delete existing appointments. An appointment availability panel is on screen at the same time and shows where time segments are blocked out as your Day Planner changes. This panel lets you see conflicts and opportunities as they arise, and you can get a quick view of the notes behind an appointment by clicking on the appropriate block in the panel.

By clicking on the Day Planner's Month or Week buttons, you can view all your upcoming appointments for those periods. You can note important appointments all the way up to the year 2079. You can even color-code events by priority: red for "critical," blue for "noncritical," and green for "holiday." You can set alarms so you won't be late for that meeting with the boss. Meanwhile, at the bottom of the Day Planner, a three-month-at-a-glance calendar gives you a still broader view of your schedule.

The LAN version, which runs on Novell, Banyan, Artisoft, and *LAN Manager*–based networks, lassos time for everybody on the network. By overlapping calendars for any number of people on a single screen, you can see mutually available time slots. Once you choose the meeting times, *OnTime* updates all schedules and sends a notice to everyone involved.

OnTime for Windows also prints out a letter-sized sheet you can fold into a handy personal itinerary; it contains a to-do list, a list of upcoming events, a year-at-a-glance calendar, and a monthly calendar of appointments.

Considering the amount of money you'll save on aspirin alone, the $129.95 price for the single-user version isn't bad. The LAN version starts at $356 for three users.
—*Bronwyn Fryer*



This scheduling specialist skips many project management functions to put what you need on screen for scheduling you and your work group.

IN BRIEF

OnTime for Windows
WINDOWS This Windows-based scheduler helps single or networked users set up and coordinate meetings, appointments, and other events.

OnTime for Windows
Campbell Services Inc.
21700 Northwestern Hwy. #1070
Southfield, MI 48075
800/345-6747,
313/559-1034 (fax)
Reader service no. 684

MergeMaster Stairway

Play Post Office From Your Data Base

Are you tired of having to wrestle your data base to the ground just to program a script that your word processor can understand? *MergeMaster Stairway* is capable of converting data files from *dBASE, Paradox,* and *Clipper* into your word processor's merge format.

This utility doesn't make sense for a letter here or there, but *MergeMaster*'s menu-driven interface and context-sensitive help make it an essential tool for creating really big merge files.

Just select a data base file—one at a time—and *MergeMaster* will display the names and types of all fields in the file. Mark the ones you're after, select your word processor format, and name the output file. Then, using your word processor's mail merge function, you can plug the merge file into letters, billing statements, reports, and other documents.

If you've got a big data base and need only a few records, a single fill-in-the-blank screen helps you define record selection criteria even more quickly. For example, you can easily select all your clients older than 30 who have made purchases within the past year and live in Florida. *MergeMaster* will sort your merge file as well as your final output by any fields you choose. The program prompts you to fill in the blanks for standard selection parameters such as <, >, =, <=, >=, <>, AND, and OR.

MergeMaster requires 384K. The $79.95 program supports ASCII files, *WordPerfect 4.2, 5.0,* and *5.1, Word 1.0* and higher, *WordStar 3.0* and higher, *XyWrite III, Volkswriter 3, DisplayWrite 3* and *4,* and *PFS:Professional Write.* —*Bronwyn Fryer*

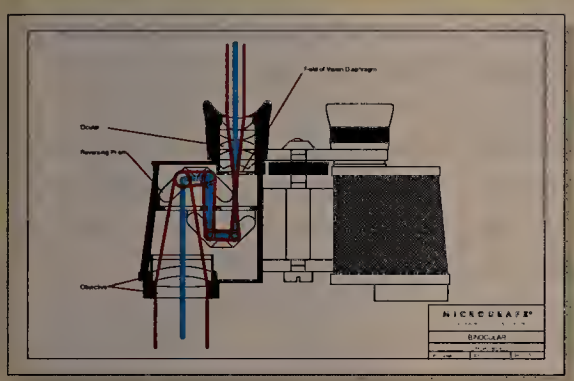
IN BRIEF

MergeMaster Stairway
This utility lets you quickly merge fields from your favorite data base with files from your favorite word processor.

Software, Inc.
700 Harris St. #204
Charlottesville, VA 22901
800/782-4792,
804/979-3749 (fax)
Reader service no. 682

Focus on Precision Illustration With New Designer 3.1

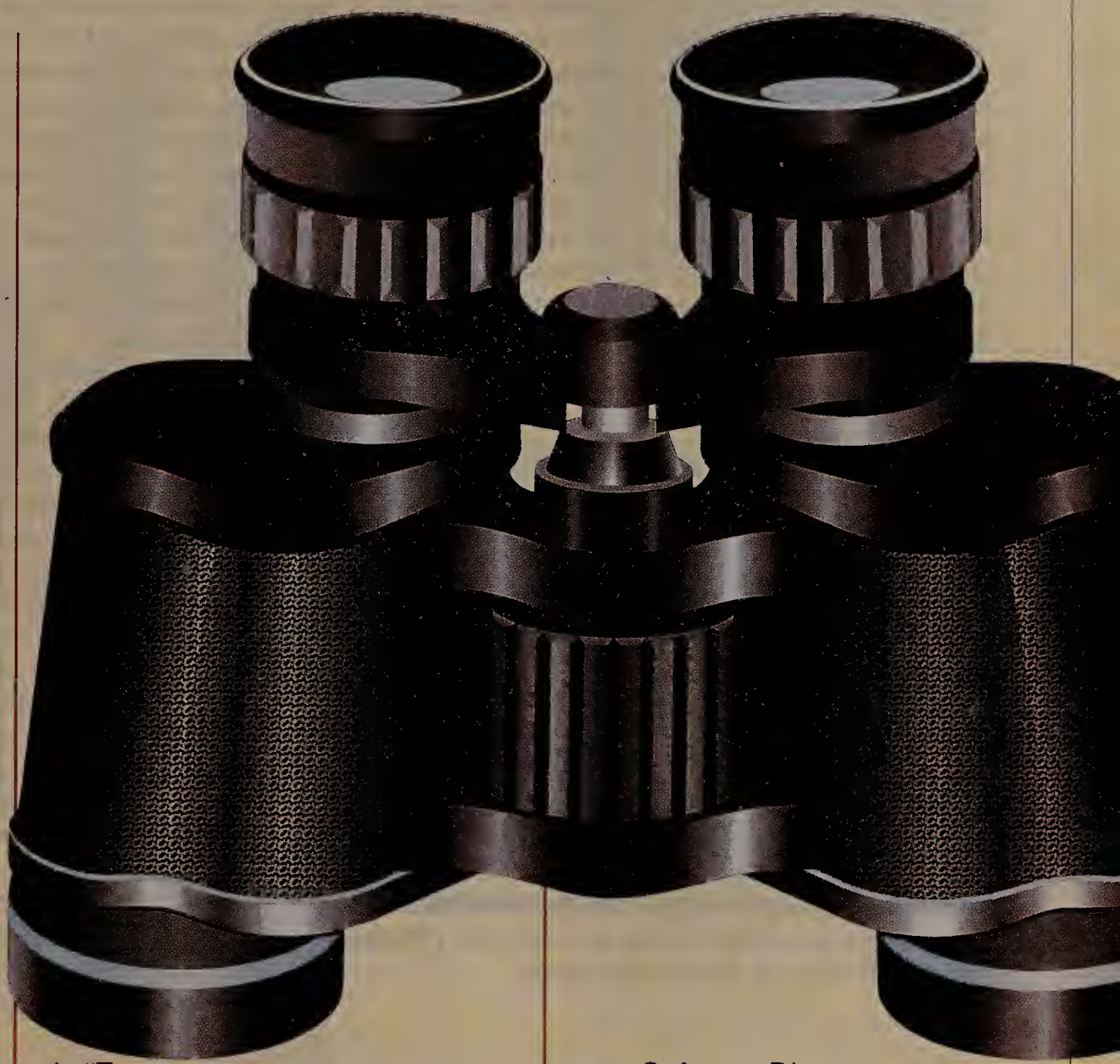
See for yourself. New Designer 3.1 turns your PC into a precision illustration tool, running under the Microsoft® Windows™ environment. You'll get more accuracy in technical illustrations, greater performance in graphic designs and higher speed in desktop publishing layouts. It's now easier to turn what you can imagine into an image all can see. Call for your free trial software and feel the high performance yourself.



▲ *Higher performance in Designer 3.1 speeds up drawings with faster wide styled lines–even wide dashed lines. Object snap points make precision a given.*

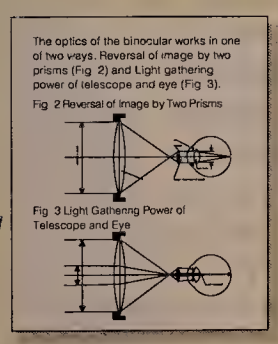
The view from out front. With new Designer 3.1 you're ahead of the pack no matter how you look at it. With more usable features, higher performance operation and more flexible file handling, you'll be able to create and manipulate an image until it's just right. That's precision.

▲ *Choose from 16.4 million colors and save any number of custom palettes for later use. Combine text and graphics with bitmapped images and true layering.*



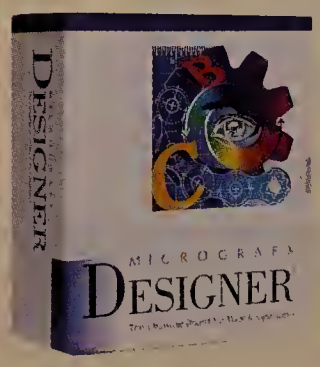
▲ *"The power-users choice . . . a customizable toolbox has a tool for just about anything; precise and accurate autotracing utility, CAD-like layering and superb color-publishing capabilities," says PC Magazine.*

▶ *Desktop published articles become clearer with precision illustration from Designer 3.1. Multiple file formats speed up import and export of files.*



Outside perspective reflects well. "Designer is an outstanding illustration package that receives Editor's Choice recognition. Designer is perhaps the most sophisticated of all the illustration packages," writes *PC Magazine*.

Software Digest reports that "Designer provides the best overall graphics package. The program offers state-of-the-art features, good performance, and unmatched ease of learning and use in a sophisticated package. Designer can handle virtually any free-form graphics or design task with ease." Designer was awarded a top-of-the-class rating.



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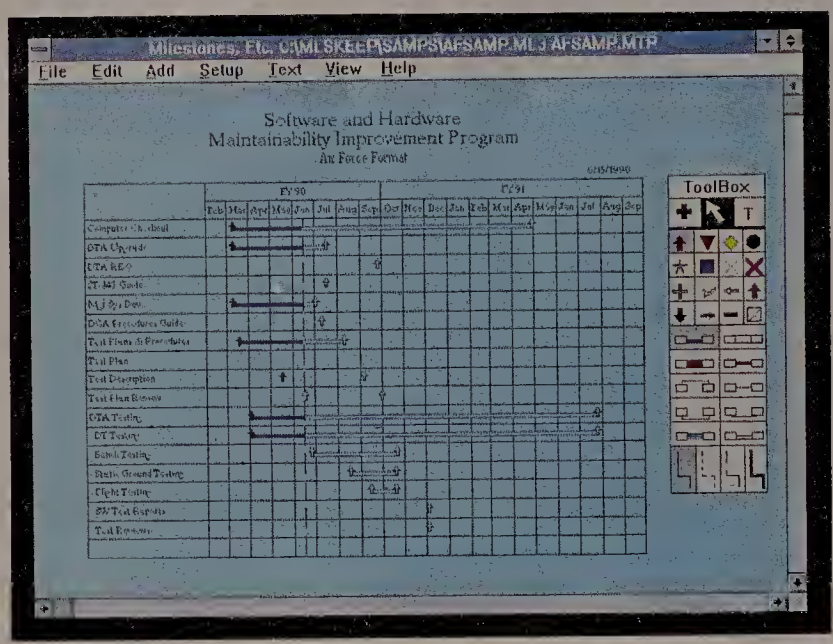
Circle 179 on reader service card

Milestones, Etc. 3.0

Graphical Click-and-Drag Scheduling

As project management continues to spread among occasional users, the pressure has increased on software providers to deliver features combining power with ease of use. That usually means a graphical orientation—and Kidasa's schedule builder already enjoys a head start.

A *Windows* product since its first release, *Milestones, Etc.* lets you lay out a simple schedule by creating a bar chart, as opposed to more traditional packages that draw the graphics after you enter the target dates for your tasks. Even Symantec's new *On Target* makes you adhere to critical-path methodology. But *Milestones, Etc.* lets you use a mouse to click and drag lines to describe your tasks; you type in an appropriate description afterward.



Milestones, Etc. lets you click and drag your way through a Windows bar chart template to lay out and alter your schedule.

Version 3.0 makes this process still simpler by adding an easily accessible toolbox of symbols; predefined chart templates; and free-form text editing. You point and click on the symbol you want to use from the new toolbox to represent the dates. (The symbols range from triangles to round bullets to stars, and you can customize the size, color, and text associated with each item in the toolbox.)

There's plenty of intelligence behind the simplicity. When you point and click on the task line, a window showing the task's completion date pops up. That date changes as you move the mouse back and forth, and a symbol with the correct date is left when you release the button. You can create multiple milestones for a task with this simple click-and-drag method—something you won't find even in many high-end project management packages.

Rather than using dialog boxes for adding task descriptions (as in version 2.0), version 3.0 lets you add free-form text anywhere on screen. You can shift dates for all tasks in the chart by a fixed amount and merge subordinate schedules into one master project. Also new: You can store symbol and text specifications in a template that can be used by the whole company, for standard chart appearance.

You need *Windows 3.0* for *Milestones, Etc.*, whose $189 price is $40 higher than that of version *2.0*. Registered 2.0 users can upgrade for $40, while owners of previous versions can upgrade for $60. —*Mark Burgess*

IN BRIEF

Milestones, Etc. 3.0
WINDOWS This easy scheduler becomes easier still, thanks to predefined templates, free-form text, and intelligent symbols.
Kidasa Software
1114 Lost Creek Blvd.
#340
Austin, TX 78746
512/328-0167
Reader service no. 681

FontBank Cartridge

Smorgasfonts

Tired of the same old menu of 35 scalable and 14 bit-mapped fonts? Pacific Data offers you a taste of something different, letting you pile up to 750K worth of soft fonts of your own choosing into its FontBank Cartridge.

In the past you had to either buy the cartridge combinations offered by manufacturers or suffer the interminable delays of downloading software-generated bit maps. Now you can pick some from PCL 4 bit maps or some from PCL 5 scalables (if you have one of the LaserJet III series printers) or toss a mélange of bit maps from Zsoft or Bitstream. Pacific Data figures you can pile about 50 8- to 12-point bit maps or 9 scalable outlines into FontBank—as long as the latter are Intellifont compatible. Sorry, no PostScript scaling yet, but you can download bit maps from Adobe's font foundry.

If you're like most folks, you'll still mostly use your laser's built-in Times and Helvetica. But you may also regularly need a 12-point Futura Bold to make fax transmissions more readable or a condensed font to squeeze more spreadsheet numbers onto a page. You may simply have a taste for the bizarre—Post Antiqua or Zapf Chancery. Why not? That's why they call them *personal* computers.

No more waiting for soft fonts to download, no need to waste valuable PC disk space, no more stacks of cartridges on your laser. The flash ROM cartridge holds your selections even when the printer is turned off and can be changed anytime you want.

FontBank's PC-based software keeps track of how much of what is loaded in the cartridge and updates the font libraries in your applications. It's compatible with *Windows 2.x* and *3.0*, *WordPerfect 5.0*, and *Word 5.x*.

The FontBank Cartridge is compatible with Hewlett-Packard's II and III series printers (but not clones) and requires no additional memory in your printer. At $299, it's like having money in the bank instead of in font cartridges. —*Mike Hogan*

IN BRIEF

FontBank Cartridge
This 750K plate lets you belly up to the font bar and pile on only the typefaces you like most.
Pacific Data Products
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San Diego, CA 92121
619/552-0880,
619/552-0889 (fax)
Reader service no. 680

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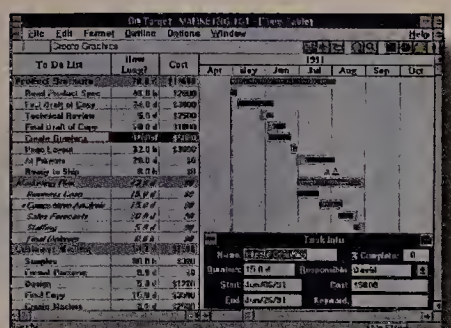
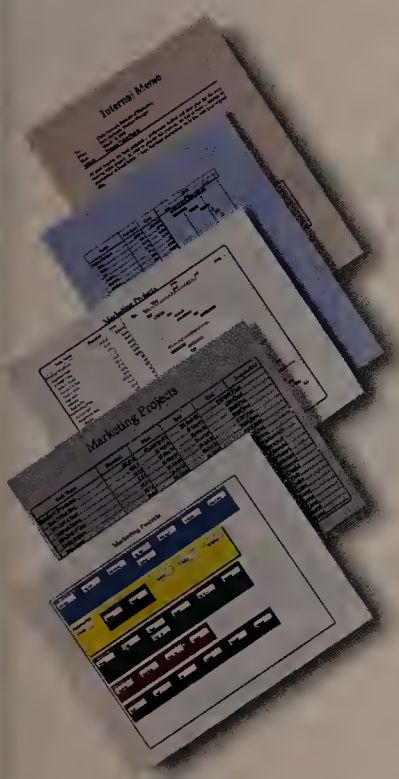
Project Calendar™ *presents your schedules in a familiar calendar format—and that's just one of the many On Target reports.*



On Target is designed specifically for Windows™ 3.0. Its graphical user interface, familiar spreadsheet format, and full color WYSIWYG graphics make project planning easy.



On Target creates a number of different reports. You can also copy graphics into other Windows applications.

With On Target, everyone is clear about their responsibilities—so your team can work together more effectively.

It's 2:30 a.m. Do you know where your projects stand? Now you can avoid those horrifying all-nighters with On Target™—the Windows 3.0 project planner from Symantec.

On Target is the easiest way to keep tabs on virtually all your projects at once. It's the most appropriate way, short of formal "project management," to manage all your schedules and deadlines.

On Target instantly converts your projects into a variety of detailed schedules, charts and graphs. Just enter your schedules into the familiar spreadsheet interface, and choose your own colors, fonts, and display format. On Target does all the rest.

On Target's *Schedule Assistant*™ guides you logically through the planning process. It even comes with *Starter Schedules*™ to help you start planning right away. So if your work load has become a nightmare, rest easy. It's all in a day's work with On Target.

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Windows 3.0 Product

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Circle 109 on reader service card

Address Express

Is Printing Envelopes as Easy as Making Toast?

This network printer just prints envelopes well, snatching addresses from any application—be it word processor, data base, or spreadsheet.

The tag line on Address Express is "the first on-line envelope addressing system that's as simple to use as a toaster." Well, not quite. And besides, anyone who's made toast knows that it's more art than science.

But at least this $1195 printer and network software combo won't burn your envelopes, and it's a lot more convenient than grappling with your laser printer. Simplicity is the hallmark of this network appliance. Application independent, it automatically identifies and prints addresses, whether they come from your word processor, data base, or spreadsheet. You can select from a series of preformatted address layouts or customize them to your corporate look.

You can also import graphics to spruce up your envelopes and add postal bar codes to save 2 cents off first-class postage. The software also automatically translates the ZIP code you type on the address into PostNet bar code, including the marks required for automated mail processing.

The printer is a 10-pin ink jet with a $10 ink cartridge/pin head that's good for 2500 copies. It can print up to four envelopes a minute at 192-by-192-dpi resolution. It also prints to the edge of the envelope—a must for bar coding. It supports HP soft fonts and comes with 27 fonts.

An embedded 8-bit processor provides a real-time LED status display of the size envelope in the tray, whether the tray is empty, and whether any doors are open. An optical sensor detects the size of paper in the tray and alerts you to paper jams.

Address Express's DOS-based software runs on Advanced NetWare 286, NetWare 386, and NETBIOS-compatible networks. Its address management and layout software (a 10K memory-resident program) lets you design your own envelope and add clip art or import images in PCX, BMP, or TIFF format. You get preformatted layouts for envelopes, labels, and postcards and can print on everything from Rolodex-sized labels to size 11 envelopes. —*Russell Glitman*

IN BRIEF

Address Express
This addressing system includes a printer plus address management and layout software—with full network support.
Tidemark Corp.
39899 Balentine Dr.
#320
Newark, CA
94560-5363
800/457-7559,
415/490-4047 (fax)
Reader service no. 687

Safari NSX/20

On Safari With the King of the Jungle

Yes, it *is* a jungle out there—but AT&T's Safari NSX/20 is designed to bring you back alive. Arguably the prettiest notebook on the market, it features elegant art deco styling that sets it apart from the boxy-notebook pack. But the beauty of the Safari is more than case deep.

Unlike most notebooks, which are designed for a lot of home-office jaunts and only occasional road trips, the Safari can smooth out the bumps for the truly hard-core salesperson, accountant, or engineer who seldom comes in off the road. You get an exceptional display; a no-compromise keyboard; and up to 6 hours of battery life, thanks to the Safari's twin batteries. Most other notebooks conk out after 2 hours, but the Safari will let you compute coast to coast without ever making you turn to the in-flight movie—unless you want to.

It weighs in at a slightly hefty but still reasonable 8½ pounds—including a 40MB hard disk, a built-in floppy, an AC charger, and cables—and has everything you need to survive on the road. A bright 10-inch screen delivers a crisp, even display with 32 shades of gray in all VGA modes and an amazingly wide viewing angle. A 2400-baud MNP 5 modem is standard equipment, as is a mouse and a PS/2 port for it.

Business explorers who want to light a *Windows* flame in the heart of darkness will find the Safari's 20-MHz 386SX CPU for powering multiple applications in Microsoft's popular environment. Its standard 2MB of RAM is expandable to 8MB, and an optional 80MB drive will provide more than enough elbowroom for the most serious *Windows* fanatics. Not only is *Windows 3.0* included free, it's preloaded.

The 82-key keyboard is excellent. There are 12 dedicated function keys; dedicated cursor keys in the familiar inverted T; dedicated page keys; and "control" keys right where your fingers expect to find them. You won't lose time through typing errors. The Safari isn't cheap—it lists at $6194 in *PC World*'s standard configuration (4MB of RAM, modem, DOS). It's not that bad, though, compared with similar 20-MHz powerhouses from Compaq ($8316) and TI ($6997). —*Michael Goodwin*

IN BRIEF

Safari NSX/20
WINDOWS This no-compromise notebook comes with a 2400-baud modem and two built-in batteries that promise 6 hours of life.
AT&T
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Morristown, NJ 07962
800/247-1212
Reader service no. 670

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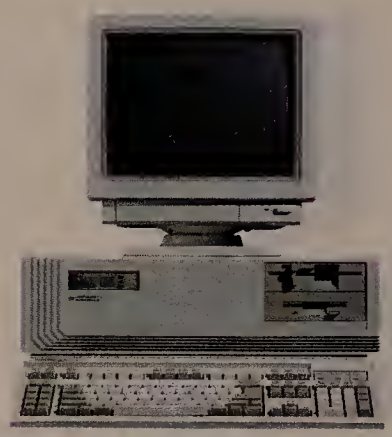

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Speed up processor-intensive business applications with an Intel or Weitek® math coprocessor. A Northgate Systems Consultant can help you select the right one for your system.

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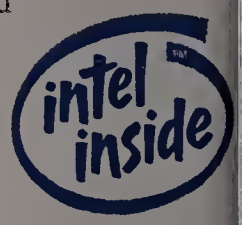
To protect your valuable data, Northgate offers an array of high-speed tape backup devices. Choose internal or external designs in the following capacities: 40/120MB, 80/304MB, 80MB, 150MB, 300MB and 1.3GB.

Communications
Northgate has the right equipment to link your system to other computers or fax machines. Products include internal and external MNP-5 modems in 2400 and 9600 baud speeds. Also available is Northgate FaxIt for Windows, a revolutionary fax card designed to work from within your Microsoft Windows applications.

Printers
The best thing to have beside your computer is a printer from Northgate. Printer options include low-cost 9-pin and 24-pin dot matrix printers as well as PostScript-compatible laser printers for the very best print quality.

Floppy Drives
Floppy drive options include 5.25″ models in 360K and 1.2MB designs and 3.5″ models with capacities of 720K and 1.44MB.

CD-ROM & Other Hardware
We can also configure your Northgate system with many other hardware options, including CD-ROM drives, upgraded video cards, and I/O cards. Call and ask a Northgate Systems Consultant for the latest options and prices.



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   ☐ Home ☐ Business ☐ Both
2. If you indicated "business," what is your role in the purchase of computer systems?
   ☐ Decision-maker ☐ Decision-influencer ☐ None
3. What computer products have you been considering?
   ☐ 386SX-based systems ☐ 386-based systems
   ☐ 486-based systems ☐ Notebooks
   ☐ Dedicated network servers.
4. How many computer systems do you already have at your company? _____
5. When will you most likely make your next computer purchase decision?
   ☐ Less than 3 months ☐ 3-6 months
   ☐ Within 12 months ☐ Don't know
6. What applications will you be running? ☐ Word processing
   ☐ Desktop publishing ☐ Accounting ☐ Database
   ☐ Spreadsheet ☐ Networking ☐ Other _____
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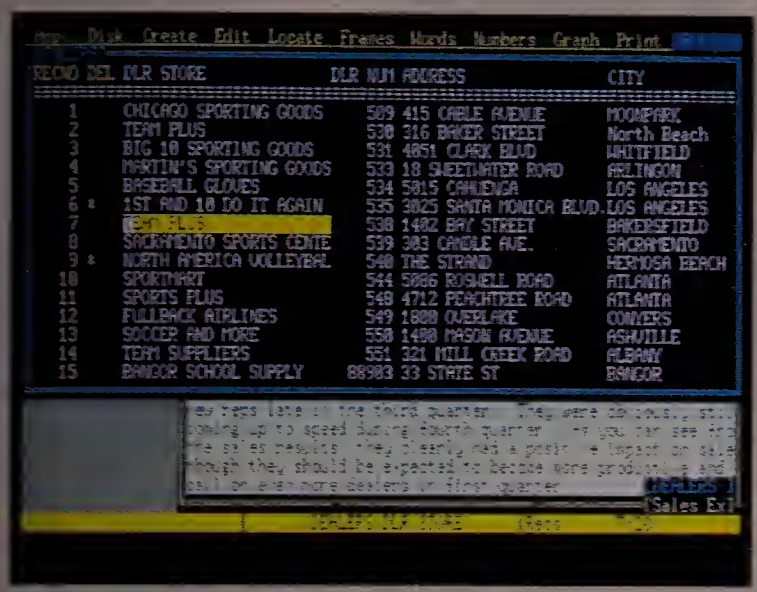
New Versions of Your Favorite Products

Framework IV



Reach out and touch your dBASE files with greater ease using this more programmable version of Framework.

Ashton-Tate's long-running integrated package has been beefed up to include more programmability and tighter links to its *dBASE* data base language. Instead of having to import and export DBF files, you can now directly browse, sort, and update them from within *Framework IV*, using its seven productivity modules as a multitasking front end to a data base application. The FRED programming language gains 40 new functions, and there is new support for proportional fonts. *Framework IV* is $695; site licenses and LAN packs are available. Upgrades are $99, as are copies of a downsized version, *Framework XE*. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90509; 213/329-8000, 213/538-7996 (fax).

Reader service no. 688

R:base 3.1 for OS/2

An OS/2 version of *R:base 3.1* provides a 30 percent performance increase with a graphical user interface. Otherwise, *R:base 3.1 for OS/2* is identical to the DOS version, says Microrim. The company maintains that full access to existing DOS applications and files is available when you install *R:base 3.1 for OS/2*. The $895 program treats *dBASE* files as if they were *R:base* tables. A five-user *R:base OS/2 LAN Pack* is available for $995. Current users can upgrade to *R:base 3.1 for OS/2* for $99. Microrim, 15395 S.E. 30th Pl., Bellevue, WA 98007; 206/649-9500.

Reader service no. 692

QuickPay

Now you can use *Quicken*, Intuit's personal finance/accounting package, to do payroll. A new add-on, *QuickPay*, calculates federal, state, and local withholdings and deductions and writes the appropriate payroll checks from within *Quicken*. Deductions and payroll information are automatically recorded in your check register. *QuickPay* sells for $49.95. Intuit, P.O. Box 3014, Menlo Park, CA 94026-3014; 800/624-8742.

Reader service no. 689

DataSave, Get Paid Plus

Great American Software, developer of *One-Write Plus* and *Money Matters*, has introduced two add-ons for these entry-level accounting programs. *DataSave* is a $39.95 backup and data compression utility, and the $129.95 *Get Paid Plus* is a collection of prewritten letters that can be linked to the accounting programs or used as a standalone. The 200 letters in *Get Paid Plus* address issues relating to collections, credit, vendor/customer relations, human resources, and sales and marketing, and they are editable. *DataSave* requires 512K of RAM, a hard disk, and DOS 3.1 or later and works with *Get Paid Plus*, *One-Write Plus 2.05*, and *Money Matters 2.0*. Great American Software, Inc., 615 Amherst St., Nashua, NH 03063; 800/388-8000, 603/881-9337 (fax).

Reader service no. 690

AST Desktop, Portable Upgrades

AST Research is offering a 9600-baud fax-modem for its Premium Exec 386SX/20 and 286/12 notebook computers. The $499 add-in board includes a 2400-baud data modem that supports MNP 5 and V.42 and V.42bis data compression/error correction standards. A second serial port is $99. AST has also lowered prices 10 to 59 percent on FASTboard CPU upgrades on its Premium desktop and tower line. The FASTboard 486/33 is $3045 with 8MB of RAM and $2595 with 4MB; FASTboard 486SX/20 is $1595 and the FASTboard 386/33 is $1545—both with 4MB. AST Research, Inc., 16215 Alton Pkwy., P.O. Box 19658, Irvine, CA 92713-9658; 714/727-4141.

Reader service no. 693

LaserJet PostScript Cartridge

If you bought a Hewlett-Packard LaserJet IIIP with a PostScript cartridge before July 1, or have been using a cartridge for the IIP with your new printer, HP wants to make a deal. Send the company your old cartridge, and it will give you a new one that lets you disable the IIIP's Resolution Enhancement technology (RET) and change density settings from the printer's control panel. While the IIIP's default RET settings are fine for most jobs, you may want to adjust them when you print graphics. Order replacement cartridges at 208/323-2551. Your old cartridge and proof of purchase of a LaserJet IIIP are required. Hewlett-Packard, 19310 Pruneridge Ave., Cupertino, CA 95014; 800/752-0900.

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For more information about any product, contact the manufacturer or circle the number on the reader service card.

dFacts Are In.

DATABASE COMPARISON TABLE	dBASE IV version 1.1	Paradox version 3.5	FoxPro version 1.02
EASE OF USE			
Control Center organizes data, queries, forms, reports, labels, applications on one screen	Yes	No	No
Create applications *without programming*	Yes	Yes	No
Modem pulldown menus for all Design Tools	Yes	No	Limited
Query by Example (QBE) for easy access to information	Yes	Yes	No
Context specific help by menu item	Yes	No	No
PRODUCTIVITY			
Quick Layout for automatic forms, reports and labels	Yes	No	Yes
Application Generator for quick application development	Yes	Yes	No
Automatic code generation for all Design Tools	Yes	No	No
Automatic maintenance of multiple indexes for ordering data	Yes	No	No
Memo fields for notes, letters, descriptions	Yes	No	Yes
POWER & FLEXIBILITY			
Bold, underline, italic, subscript, superscript text for high impact reports and labels	Yes	No	No
User Defined Functions for extending programming language	Yes	No	Yes
Data input validity checking in forms	Yes	Yes	Yes
Multi-user transaction processing ensures data integrity	Yes	No	No
Number of file formats imported/exported	7	6	3
INDUSTRY STANDARDS			
#1 Selling, #1 Rated multiuser database; over 3 million users (1)(2)	Yes	No	No
Compatible with dBASE III PLUS data and applications	Yes	No	Yes
Compatible versions for DOS, VAX VMS, Macintosh, SunOS and other UNIX platforms (3)	Yes	No	Limited
Structured Query Language (SQL) integrated with programming language	Yes	No	No

(1) dBASE III PLUS and dBASE IV comprise approximately 55% of PC database systems sold (3 times nearest competitor) according to the most recent report by the market research firm Audits & Surveys (Oct. 1990) (2) Software Digest rated dBASE IV #1 among multiuser databases, October 1990 (3) Versions of dBASE IV are shipping for DOS, VAX, and SunOS. Macintosh and other UNIX Platforms are announced.

Based on what our customers tell us, we made a list of some of the most important features to look for in data management software.

Then we compared the new dBASE IV® version 1.1 with two other database products.

As you can see, dBASE IV offers exclusive advantages in many categories.

For instance, only dBASE IV lets you access all its functions from a single screen. Called the Control Center, this screen lets you manage existing data, and create new tables, queries, reports, forms and labels totally without programming.

When all the facts are on the table, it's easy to see which database software is best.

Of course we aren't the only ones who have come to this particular conclusion.

Software Digest rates dBASE IV version 1.1 the #1 Multiuser Database (Vol. 7, No. 13, Oct. '90).

Trademark/owner: dBASE IV, Ashton-Tate, Ashton-Tate logo/Ashton-Tate Corp. Other company or product names mentioned may be

dTruth Comes Out.

Software Digest **RATINGS REPORT**®

The Independent Comparative Ratings Report for Selecting IBM PC Business Software

Volume 7, Number 13

MULTIUSER DATABASE PROGRAMS

Ratings Key: ■ 7.0–10.0 ■ 5.0–6.9 ■ under 5.0

Software Digest Rating	Overall Evaluation	Overall Power	Program Name	Version Tested	Performance	Versatility	Error Handling	Ease of Learning	Ease of Use	Memory Requirement	Price	Volume Purchase Agreements	Page
★★★	7.0	6.7	dBase IV	1.1	■	■	■	■	■	450KB	$795	✓	28
★★	6.8	5.1	Paradox	3.5	■	■	■	■	■	640KB	$995	✓	32
★★	6.8	7.1	FoxPro/LAN	1.02	■	■	■	■	■	512KB	$1,095	✓	30
★★	6.4	5.1	DataEase	4.2	■	■	■	■	■	640KB	$750	✓	26
★	5.8	3.6	R:Base	3.0	■	■	■	■	■	520KB	$995	✓	34
★	5.7	6.0	Clarion Professional Developer	2.1	■	■	■	■	■	512KB	$845	✓	24
	5.7	6.6	Advanced Revelation	2.01	■	■	■	■	■	640KB	$995	✓	22

Perhaps the most independent publication in the industry, *Software Digest* accepts no advertising whatsoever. Corporations pay hundreds of dollars a year to receive their monthly reviews—which are considered highly unbiased and objective. Their exhaustive, 75-page report concludes:

"Among the top ranking programs, dBASE IV (version 1.1) is the most well-rounded, with solid performance, versatility, and usability." Commenting on speed, *Software Digest* points out that "dBASE IV produces all three test reports as fast as or faster than FoxPro/LAN." As for Ease of Use and Ease of Learning, dBASE IV scored in the Excellent Range as many times as any other multiuser database product tested.

For a free evaluation kit, including competitive details and a free demo disk, call toll-free: 1-800-437-4329 ext. 1416. Better yet, call 1-800-2ASHTON to upgrade to the new dBASE IV now.

The truth is, no other database can do so much to improve productivity.

Ashton-Tate®

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Circle 15 on reader service card

25-MHz 386 PCs:

Get 'Em While They Last

These 14 business boxes are fast, expandable, and cheaper than ever. It matters little that they're probably headed for extinction—when the price gets low enough, buy, buy, buy!

Robert Lauriston

Call it the PC domino effect. With low-cost 20-MHz 486SX and 40-MHz 386 systems arriving on the scene, 386 systems running at 33 MHz drop in price. This causes the price of 25-MHz 386 systems to drop so low that they eventually have to be discontinued before they interfere with the sales of lower cost 386SX systems.

PHOTOGRAPHS BY STAN MUSILEK

So if 386 25s are on the way out, why bother to review them? Because over the next six months or so, the 386 25 will be one of your best PC buys. These systems are powerful, affordable, and will maintain their usefulness for years to come. They're powerful enough to handle any mainstream business application—from basic word processing to full-blown *Windows* multitasking—and their prices are falling fast.

At the moment, 25s are getting squeezed from two directions. If you can dig up another couple hundred dollars, you can put a comparably configured 33-MHz 386DX on your desk—and if you're a CAD master or a desktop publisher, that's money well spent. At the other end of the spectrum, if you're willing to settle for a slower 20-MHz 386SX, you can keep about $500 in your pocket and still run *Windows*. If you're

These 25-MHz 386s are a great value. But don't wait too long, or they'll disappear from the shelves.

waffling between a 20-MHz SX and one of these 25-MHz models, be sure to consider expandability—most of these systems offer more drive bays and expansion slots than a typical SX.

Although we review the systems as personal workstations, a 386 25 is also a bargain hunter's file server. But make sure your network is small, quiet, and undemanding. We currently recommend at least a 33-MHz system for server duty.

Prices in Free Fall

These 386 25s bring good news to budget-minded business buyers. The last time we looked at this category ("25-MHz 386s: Great Performance in a

FEATURES EVALUATION

Low Prices Put Spotlight on Features

As 25-MHz 386 desktop prices plummet across the board, features become the key consideration. Best Buy systems Eltech, Everex, and Northgate give you notable expandability, speed, and service.

● Yes
○ No
◒ Deficient
n/a = not applicable

	Acer 1100/25	Austin 386/25 WinStation	Compaq Deskpro 386/25e	Dell System 325D
Standard features				
Street price[1]	$3363	$2388[3]	$4469[2]	$3778
Memory cache	32K	n/a	32K	32K
Expandability				
Free 32-bit slots	0	0	0	0
Free 16-bit slots	4	5	4	5
Free 8-bit slots	1	1	0	1
Accessible/internal drive bays[5]	3/2	3/1	3/1	3/1
Largest hard disk option	676MB	1.2GB	320MB	650MB
Upgradable CPU	○	○	○	○
Fast RAM capacity	24MB	8MB	16MB	16MB
Accepts standard SIMMs	●	●	○	●
Design and construction				
Switchless setup	○	○	●	○
Setup utility in ROM	●	●	●	●
Compact footprint[7]	○	●	●	●
Tilt-and-swivel monitor	●	●	●	●
Front-panel on/off switch	●	○	●	●
Parallel/serial/mouse ports	1/2/0	1/2/0	1/1/1	1/2/1
Service and support				
Warranty period (months)	24	12	12	12
On-site service less than $100 per year	○	●	○	●
Vendor support				
Central support/toll-free	●/●	●/●	●/●	●/●
Daily support (hours)	12	15	12	12
Weekend support	○	●	○	●
Electronic BBS/fax	●/●	●/●	●/●	●/●
Vendor-to-dealer support				
Dedicated support staff required	●	direct	●	direct
Support staff training required	●	direct	●	direct
Dedicated support line for dealers	●	direct	●	direct
Inventory and parts requirement	●	direct	●	direct

[1] Except as noted, price based on 4MB RAM, 90MB–110MB hard disk, 1.2MB or 1.44MB floppy drive, one or more parallel ports and two serial or one serial and one mouse port, VGA card and color VGA monitor, 101-key keyboard, mouse, and DOS 3.30 or later.
[2] With 120MB hard disk.
[3] Includes 80MB–85MB hard disk.
[4] With 150MB ESDI hard disk and controller.

Eltech Model 9870	Epson Equity 386/25 Plus	Everex Step 386/25	FastMicro FastData 386/25	HP Vectra 386/25PC	IBM PS/2 Model 70-A21	Memorex Telex 7270 Intelligent Workstation	Northgate Elegance 386/25	Tandy 4025 LX	Zenith Data Systems Z-386/25
$2599	$3386	$3031	$1640[3]	$4686[3]	$4862[2]	$4118	$3249	$4848	$4186[4]
64K/256K	32K	128K/256K	n/a	32K	n/a	32K	64K	32K	16K
0	0	0	0	0	2	2	0	0	0
5	3	5	4	4	1	3	5	5	4
1	1	1	2	1	0	0	1	0	0
3/2	2/1	3/1	5/0	3/0	2[5]/1	3/1	3/2	3/1	4/2
1.2GB	100MB	1GB	660MB	336MB	400MB	338MB	1.2GB	440	320
●	○		○	○	●	○	●	○	○
16MB	14MB	64MB	16MB	32MB	6MB	16MB	16MB	16MB	44MB
	●		●	○	●	○		●	●
●	○	●	○	○	●	●	●	○	●
	○		●	○	○	○		○	●
●	○	●	○	○	●	●	●	○	○
	●		●	○	●	●		○	●
●	●	●	●	●	●	●	●	●	○
1/2/0	1/1/1	1/2/0	1/2/0	1/1/1	1/1/1	1/1/1	1/2/0	1/1/1	1/2/0
12	12	12	12	12	12	12	12	12	12
	○		◒[9]	○	○	●		○	●
	◒/○	●	●/●	●/●	○/○	●/●		●/○	○/○
8.5	9	9	8	13	0	12	24	8	0
●	○	●	●	○	○	●		○	○
●	○/○		●/●	●/●	○/○	○/●		●/●	○/○
●	●		direct	●	●	direct	direct	○	●
	●		direct	●	●	direct	direct	●[12]	●
●	●		direct	●	●	direct	direct	●	●
	●	●	direct	●	●	direct	direct	○	●
BEST BUY		BEST BUY					BEST BUY		

Small Box," December 1990) the average street price was almost $6000. By now it's well below $4000, with three systems selling for under $3000 in our standard configuration.

Of course, it's not enough for a system to be cheap. It also has to be fast. We put these 14 systems through our standard battery of performance tests, and while we found significant differences, as shown in the Test Report, it was an unusually close race. Almost half the systems performed well enough to earn 3½-star or 4-star ratings for performance. That gives you a wide choice of proven performers.

Besides balancing cost and speed, you'll want to pay close attention to expandability, RAM capacity, and quality of service and support. For a detailed discussion of these issues, see the "Buying Smart" sidebar.

Three Best Buys stand out. The Northgate Elegance 386/25 is the fastest system tested; the Eltech Model 9870 and Everex Step 386/25 aren't quite as speedy, but they're great all-around performers and cost less.

If you're stuck with a short list of authorized vendors, and these Best Buys aren't included, you still may be in luck. Some other very good buys include the Acer 1100/25 and Dell System 325D.

Before they go, the 25s' prices will drop precipitously. In fact, by the time you read this, most if not all of the systems reviewed here will probably cost a lot less than shown. That means they'll be better values for bargain hunters—but don't wait too long, or they may disappear from the shelves.

Robert Lauriston is a contributing editor for PC World.

For more information about all products in this article, circle reader service no. 901.

Acer 1100/25

PROS: Speedy, 24MB fast RAM capacity, 24-month warranty
CONS: No on-site service, fairly slow dBASE performance

With its reasonable price and fast performance, the Acer 1100/25 is hard to resist. Technical support is good, and you get the longest warranty in this roundup. The system is designed for the future—if you outgrow the motherboard's 8MB fast RAM limit you can pop in Acer's 32-bit RAM board and go up to 24MB. One nice touch: A window on the back panel lets you reset DIP switches without opening the case.

The Acer lagged a bit in *dBASE* tests so it's probably not the best choice for disk-intensive applications—unless you spend the extra bucks for a fast, third-party hard drive. But with all that potential RAM, it's a superb deal if you're planning on running tomorrow's high-end applications. The Acer 1100/25 should take you quite a long way into the 1990s.

The Acer 1100/25 carries the longest warranty of any 25-MHz system, a full 24 months.

The Austin's superb support and low $2388 street price are appealing, but its poor performance detracts.

Austin 386/25 WinStation

PROS: Low price, superior support, free on-site service
CONS: Slow

The Austin WinStation's featherweight $2388 price tag will tempt cost-conscious shop-by-mail fans, but poor performance diminishes the system's appeal. This system was one of the slowest we tested, often taking 20 to 30 percent longer than the leaders.

More's the pity, because aside from its poky performance it's a pretty nice machine. There's room for half a dozen expansion boards, two floppy drives, tape backup, and a second hard disk. Austin's service and support policies are excellent, with telephone lines open 15 hours a day and on weekends. Bargain hunters may find this compensation enough for slow performance, but they should consider one more factor—the 8MB RAM capacity is plenty for *Windows*, but it won't fully exploit OS/2 2.0 and future operating systems. All in all, though, if speed isn't crucial, the Austin is a fairly good value.

Buying Smart: How to Pick the Perfect 386 Bargain

If you have to ask how much it costs, you've come to the right place. After performance, price is the most important consideration when looking at 25-MHz 386 systems. You'll also want plenty of expandability so your purchase will stay useful, and good service and support to keep it out of the repair shop.

PERFORMANCE

As the Test Report shows, performance varies significantly from one 25-MHz system to another. It also varies depending on the application, so make sure your choice performs well on the type of program you use.

Because CPU speed is the same for all these systems, the major factors affecting performance are memory cache and disk speed. Three of the systems reviewed are cacheless (and you can buy some of the cache systems without a cache at a lower price), but the lack of a cache slows performance. A faster hard disk will speed disk-intensive applications such as *dBASE*, and a faster video board can pump up *Windows*.

PRICE

Most of these 25-MHz systems are real bargains—and we expect prices to drop even lower by the time you read this. We evaluate cost based on street price, not list. We call five dealers in eight cities and ask for a quote on the standard *PC World* configuration—4MB RAM, 100MB–150MB hard drive, one floppy drive, VGA color, one parallel port and either two serial ports or one serial and one mouse port, 101-key keyboard, mouse and DOS 3.30 or later. Results are averaged.

EXPANDABILITY

Buy a system with room to grow so you won't be stuck with limited options. First look for a system with space for expansion boards and disk drives. If your PC will be hooked to a network, where it can share the server's drives, you can get by with two floppies, a tape backup, and a hard drive—that means four drive bays, three of which must be externally accessible. A stand-alone system should have an additional bay so you can add a second hard drive or a CD ROM drive.

Every year brings more add-ins requiring an expansion slot. You may want to add boards for a network, CD ROM, modem, fax, scanner, mouse, or sound. Look for at least five free slots. Two of the systems offer 32-bit Micro Channel slots, which may provide faster throughput if you use special MCA expansion boards; but there are still relatively few MCA boards on the market. More important for most users is an upgradable CPU that can help keep the system from becoming obsolete.

FAST RAM

While 4MB may sound like a lot of RAM now, and 8MB may seem like a windfall, you'll probably want even more memory so the PC you buy today can run the hot operating systems of tomorrow. Whether that's OS/2 2.0 or 3.0, a future version of *Windows*, or something else, chances are it will want hefty amounts of fast RAM—high-speed memory installed on the motherboard, or on a special 32-bit expansion board. To get the most out of *Windows* and other high-end applications, look for a system that lets you install at least 8MB of fast RAM, and if you expect to feast on high-end applications down the line, demand a capacity of 16MB or more.

DESIGN AND CONSTRUCTION

The most important design consideration is invisible: Is the system compatible with major software programs? We run each system through rigorous compatibility testing with common applications.

You'll want a box with good ergonomics, a tilt-and-swivel monitor, a reset button, a compact footprint to save desk space, switchless setup for easy configuration, and an easy-to-open case for painless upgrades.

SERVICE AND SUPPORT

All the systems reviewed come with a warranty of at least one year, which you can extend for a reasonable charge. Look for a system that offers an inexpensive on-site service option. Otherwise you may have to ship the system back to the factory or dealer.

Companies take two approaches to technical support: Some offer direct central support by phone, others provide indirect support via dealers. We evaluate central technical support by calling each number three times and asking easy, intermediate, and difficult questions. We then score responses for promptness and accuracy, with extra credit given for long hours, toll-free access, fax lines, BBS's, and other support extras. We rate indirect support by examining the requirements vendors impose on dealers for training, inventory, and dedicated support staff, with extra credit given to vendors that operate their own stores.

Compaq Deskpro 386/25e

PROS: Switchless setup, compact footprint
CONS: Expensive, steep RAM upgrades

The Deskpro 386/25e maintains Compaq's tradition of thoughtful design and solid construction, but it fails to deliver the hot performance Compaq buyers expect. While the 386/25e did well in three of our tests, it was lackluster at *Windows*, it lagged at *AutoCAD*, and bogged down with *Paradox*. Moreover, the price is high and so is the upkeep. You must buy an expansion board if you want to expand RAM past 8MB, and because it doesn't take standard SIMMs, you have to buy the memory from Compaq at two to three times the cost of most fast RAM.

Compaq works hard to make sure its dealers provide excellent support, and now it offers direct telephone support as well. The Deskpro 386/25e is a good value overall, especially if a solid design is more important than price and performance. But you can find other well-designed machines that run faster for less.

The Deskpro 386/25e keeps up the Compaq family reputation for quality, but not for speed.

High marks for performance, expandability, and support mean this Dell is ready for any desktop.

Dell System 325D

PROS: Fast, superb support, easy to upgrade
CONS: No switchless setup

The Dell's small footprint, big expansion capacity, and hot performance should make it welcome on any desktop. While its $3778 price is above average, it buys solid construction and thoughtful design. Despite the small footprint, you get plenty of free slots and bays—and if you need to go under the hood to install RAM or drives, there's lots of elbow room, plus a carefully labeled motherboard map to help you find your way around.

Dell is known for excellent support, and the delivery is as good as the promise. Although phone service works only 12 hours a day, fax support is available round-the-clock. And LED diagnostics on the front panel will help Dell technicians diagnose your system's problem even if it won't boot or the monitor's dead. All told, the Dell is a safe choice—and it's a hot rod too.

Eltech Model 9870

PROS: Fast, inexpensive, plenty of free slots and bays
CONS: No switchless setup

The $2599 Eltech Model 9870 boasts the lowest price of our four-star performance champs, making it your Best Buy when cost is king. Nor will you have to compromise on other buying considerations. This is one of the most expandable systems here: You can plug up to 8MB of RAM on the motherboard and another 8MB on an add-in 32-bit board, and you can upgrade the memory cache for better performance in some multiuser applications. If you need to store massive amounts of graphics or data base files, you can order the system with up to 1.2GB of storage built in.

Eltech offers on-site service, and it backs up dealer support with central technical support. Their phone support is pretty good, though the switchboard could be open longer. But these are details—this Eltech Best Buy is one of the smartest 25-MHz purchases around.

The Eltech's superior performance and low $2599 price make it a budget-friendly Best Buy.

Speed Demons Galore

It's a photo finish in our speed tests, with a slew of machines that can really tear up the track.

Best Buy

WordPerfect

	seconds
Northgate 386/25	66
Dell System 325D	67
Compaq 386/25e	68
Eltech Model 9870	68
Everex Step 386/25	68
HP Vectra 386/25	69
Acer 1100/25	70
Tandy 4025 LX	70
Epson 386/25 Plus	71
Memorex Telex 7270	72
IBM PS/2 70-A21	77
Austin 386/25	79
ZDS Z-386/25	81
FastMicro 386/25	84

seconds 0 — 84

AutoCAD

	seconds
Dell System 325D	237
Everex Step 386/25	242
Acer 1100/25	246
Epson 386/25 Plus	253
Eltech Model 9870	259
HP Vectra 386/25	259
Northgate 386/25	260
Compaq 386/25e	262
IBM PS/2 70-A21	264
Memorex Telex 7270	274
Tandy 4025 LX	274
ZDS Z-386/25	317
Austin 386/25	324
FastMicro 386/25	338

seconds 0 — 338

dBASE IV

	seconds
Eltech Model 9870	488
Northgate 386/25	489
Everex Step 386/25	493
Dell System 325D	500
Compaq 386/25e	514
HP Vectra 386/25	537
Epson 386/25 Plus	542
Tandy 4025 LX	552
Acer 1100/25	562
Memorex Telex 7270	576
IBM PS/2 70-A21	587
ZDS Z-386/25	605
Austin 386/25*	645
FastMicro 386/25	656

seconds 0 — 656

Windows 3.0

	seconds
Everex Step 386/25	105
Northgate 386/25	105
Dell System 325D	106
Eltech Model 9870	108
HP Vectra 386/25	108
IBM PS/2 70-A21	111
Acer 1100/25	114
Compaq 386/25e	116
Tandy 4025 LX	118
Epson 386/25 Plus	119
Austin 386/25	125
Memorex Telex 7270	128
FastMicro 386/25	138
ZDS Z-386/25	144

seconds 0 — 144

1-2-3

	seconds
Everex Step 386/25	440
Eltech Model 9870	445
Acer 1100/25	447
Dell System 325D	447
Epson 386/25 Plus	450
Northgate 386/25	450
Compaq 386/25e	454
Tandy 4025 LX	454
HP Vectra 386/25	457
Memorex Telex 7270	471
IBM PS/2 70-A21	480
ZDS Z-386/25	489
Austin 386/25	557
FastMicro 386/25	599

seconds 0 — 599

Paradox

	seconds
Northgate 386/25	655
HP Vectra 386/25	694
Dell System 325D	695
Eltech Model 9870	696
Tandy 4025 LX	706
Everex Step 386/25	706
Acer 1100/25	709
Epson 386/25 Plus	740
Austin 386/25	745
Memorex Telex 7270	746
FastMicro 386/25	797
Compaq 386/25e	873
ZDS Z-386/25	888
IBM PS/2 70-A21	924

seconds 0 — 924

*We had to disable dBASE IV's caching feature to complete the test.

Methodology
We tested all the computers with 4MB RAM and used the vendor's version of DOS.

WordPerfect
We reformat three *WordPerfect 5.1* documents that vary in size from 5K to 55K. The files are text with some boldface and underlining; one document includes a TIFF image.

dBASE IV 1.1
With the caching feature enabled, we complete an unindexed search for a single record in a 100,000-record parts table. Then we index the table, run the transaction processing module, and post 600 records.

1-2-3
We load the application, followed by three separate worksheets (arithmetic, financial, and scientific). We make various changes and run recalcs on each. Finally we use the *MAPS* add-in from Management Advisory Services of Seattle to run a number of financial forecasts.

AutoCAD
We use *AutoCAD* release 10 to load a 500K drawing. We then mask layers, change zooms, and remove the hidden lines.

Windows 3.0
Timing begins and ends at the DOS prompt. We launch *Windows* along with a macro that loads *Microsoft Excel* with a financial worksheet and initiates a recalc. Then the macro loads Lotus's *Ami Pro* along with a 50K document that contains a 500K TIFF image. Finally, the macro launches *Micrografx Designer*, opens a drawing, displays it on screen, and exits to DOS.

Paradox
Starting with an orders table, we compare each record with an available stock table. The application finds the current price for the items and inserts the resulting record into an invoice table.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Epson Equity 386/25 Plus

PROS: Easy-open case
CONS: Stingy with drive bays and slots

As long as you don't plan to cram your PC full of peripherals, you'll probably find the Epson Equity 386/25 Plus very much to your liking. The price to performance ratio for this $3386 system is good, and it rates well in every category save expandability. One very nice touch is the design of the Epson's case: Squeeze a couple tabs, turn a knob, and the top pops right off. Once inside, you'll find the environment rather cramped—you get only three drive bays.

Epson's tough requirements for its authorized service centers should ensure good service and tech support through that channel. But if you're looking for direct end-user support, you'll discover that it's limited to a $2-a-minute 900 number. (What's next, pay-per-view cable TV access?) The Epson is a good overall value, but take a pass if you need plenty of bays for storage and backup.

The Epson Equity 386/25 Plus is a solid option as long as you don't need lots of free bays.

Massive RAM capacity and a CPU upgrade path will keep the Everex Step 386/25 useful for years to come.

Everex Step 386/25

PROS: Fast, 64MB fast RAM capacity, CPU upgrade path
CONS: No switchless setup

If you're tired of pressing <Enter> and waiting for something to happen, the Best Buy Step 386/25 is for you. Its blazing performance was only a hair away from best in the roundup, and the $3031 price is quite reasonable. The Everex will be able to handle the next generation of operating systems without breaking a sweat—you can upgrade the CPU, install 64MB of RAM, and double the size of the memory cache.

Everex has also added some thoughtful touches that pay off right now. There's a speaker on/off switch on the front panel so no one in the office will know you're running *Tetris* instead of *1-2-3*, and command keys are color-coded to match *WordPerfect*'s keyboard templates. Aside from its lack of an 800 number, service and support are superb. Aimed at the future, the Everex Step 386/25 is a great deal now.

FastMicro FastData 386/25

PROS: Low price
CONS: Very slow

If you want the least expensive 25-MHz around, you've just found it. Even swap meet specials don't come much cheaper than $1640. Naturally there's a trade-off: performance. The FastData came in last in four of our six tests, and is the slowest system overall. Furthermore, the first system we tested had a problem running *dBASE III Plus*. While a replacement unit completed our tests perfectly, this sort of thing makes us nervous, especially because FastMicro is the only mail-order company in this review that doesn't provide full on-site service. Instead, you have to wait for them to ship replacement parts. If that doesn't work, they decide whether to send out a technician or replace your system.

Considering the FastData's rock-bottom price, bargain hunters may find it impossible to resist. But don't be surprised when your DX performs more like an SX.

At $1640, the FastData is the cheapest system here, but it's also the slowest.

Of all the reasons to move to Windows, here's the best one yet.

Lotus®

It's everything a Windows spreadsheet was meant to be.

After listening carefully to what our customers were looking for in a Windows™ spreadsheet, we developed Lotus® 1-2-3® for Windows with three goals in mind.

First, make it a full-fledged Windows application.

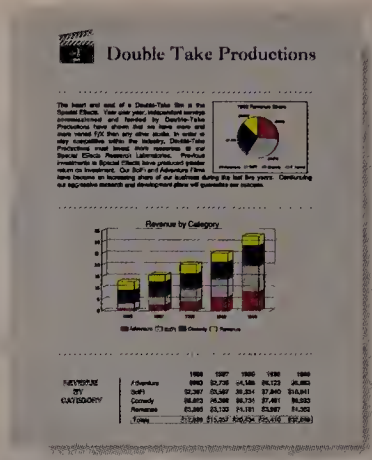
Second, introduce innovations that deliver a perfect balance of power and simplicity.

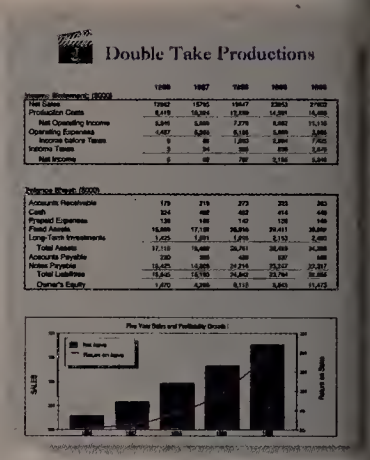
And third, make it fully compatible with all of the earlier versions of 1-2-3 that millions of 1-2-3 users are familiar with.

Well, we've done all this. And a whole lot more. Which, no doubt, is why 1-2-3 for Windows was awarded Byte Magazine's *Best New Windows Application* at Comdex/Spring '91.

For starters, the most exciting new part of 1-2-3 for Windows is its SmartIcons,™ an innovative approach for automating common spreadsheet tasks.

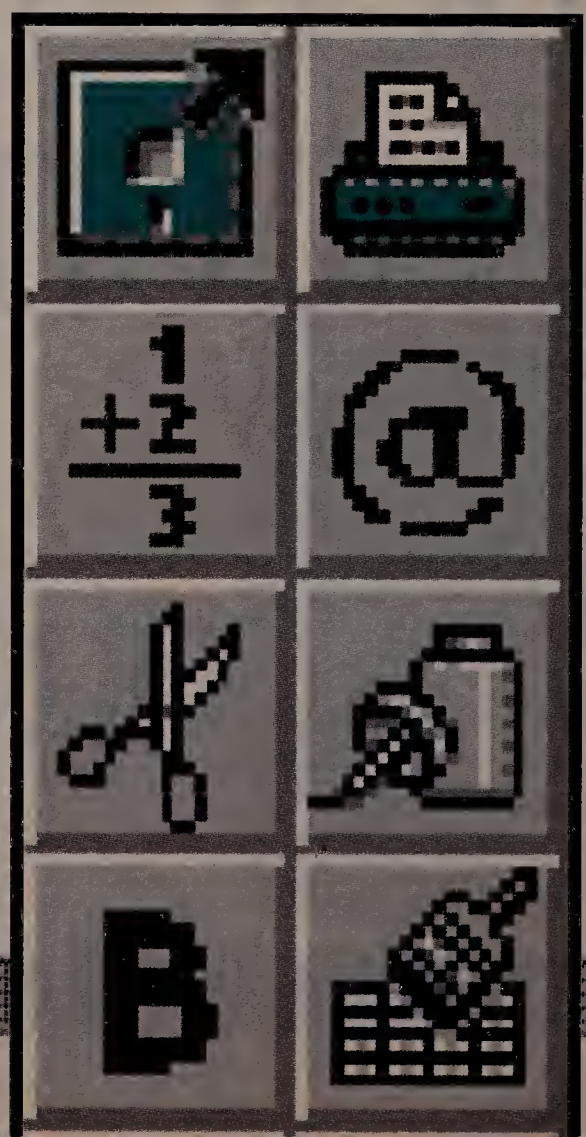
These icons are "one-click" shortcuts for your most frequently used spreadsheet tasks. Such as summing up a row of numbers, setting text to bold, creating a graph from a range of data, retrieving, saving or printing a file, table formatting or charting, and more. These





With our "zoom in," "zoom out" and fast print preview features, you can refine and perfect your work before you print. Which means your output will always be just what you want it to be. Without any surprises at the printer.

Introd 1-2-3 for



These fully customizable SmartIcons give you push-button access to basic and advanced spreadsheet functionality. Just by pointing and clicking the mouse. Over 50 standard icons come with the program. Plus, you can create new icons to suit your needs. For example, sum a column or a row or change text to bold, all in a single step.

SmartIcons are also a par of our other Windows products, including our award-winning word processor, Ami Pro™ 2.0.

And unlike the Toolbar™ in Microsoft® Excel, 1-2-3 for Windows actually lets you create your own icons for the tasks that are unique to you.

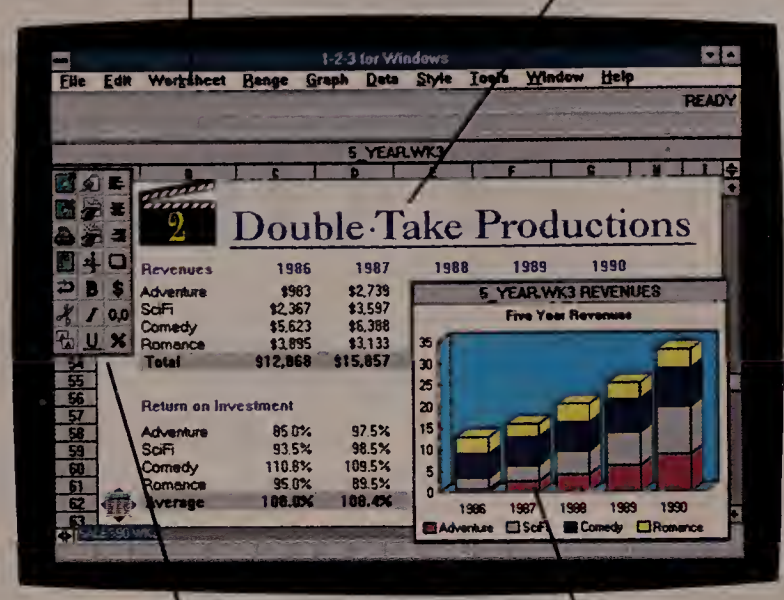
And yes, 1-2-3 for Windows fully exploits the Windows environment. Which means it

udes pull down menus, dialog boxes, sizable ıdows, mouse support, full DDE support, ıtext-Sensitive Windows Help and every-ıg else you'd expect to find in a true ıdows application.

What's more, with its interactive graph ery, you can preview and select by example ide range of graph types, including true 3D phs in bar, line, area, stacked bar and pie. ve even added a new table chart graph e. Altogether, you can create over 200 dif-ent graph style combinations.

You'll feel right at home with our true Windows interface. And you can easily integrate your spreadsheet data with other Windows applications.

The program includes Adobe Type Manager® (ATM),® the leading scalable font manager, for outstanding spreadsheet publishing and presentation options.



Our palette of customizable SmartIcons can be sized and placed anywhere on your screen.

Our interactive graph gallery means you can preview and select by example a wide range of chart and graph types.

ucing Windows.

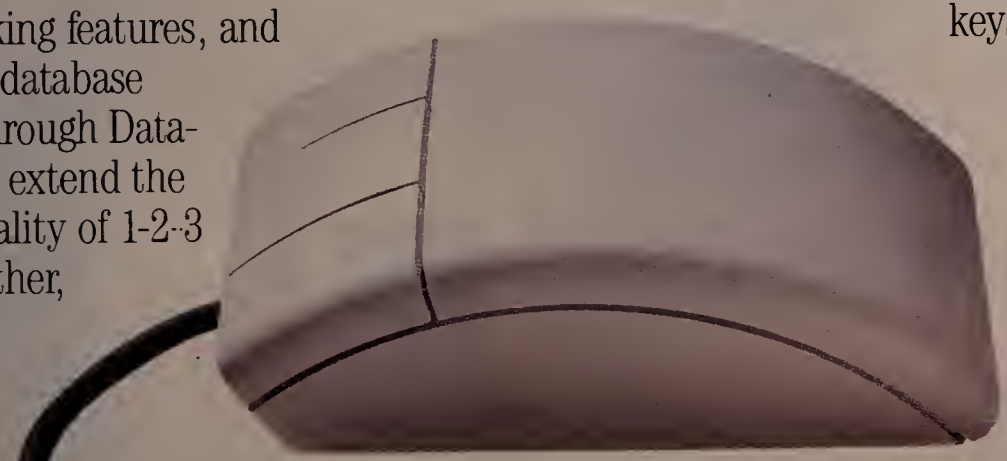
Of course, when you're ready to print, ur results will be nothing short of perfection. ıd thanks to its Auto Compress feature, you ı easily make an entire report fit on one page.

Beneath it all, you'll have all e power of 1-2-3 at work for you. cluding its innovative 3D work-eets, Solver and Backsolver al-seeking features, and ternal database cess through Data-ns.® To extend the nctionality of 1-2-3 en further, developers can use our new 1-2-3 for Windows Add-In Development Kit to create an unlimited number of customized applications.

And finally, to make the move to Windows a simple one for 1-2-3 users, we've included the 1-2-3 Classic® commands in the program. Where, at the push of the slash key, the familiar 1-2-3 menu will appear, fully functional, on screen. So not only are all the files, styles and macros you've worked with compatible with 1-2-3 for Windows, but the keystrokes you've been using to create them are, too.

But for now, turn the page. And find out even more about why 1-2-3 for Windows is the spreadsheet that over 14 million people already know how to use. Without ever having tried it.

With all the added short-cuts you'll gain from SmartIcons, the mouse will be the one thing you'll want to hang on to.

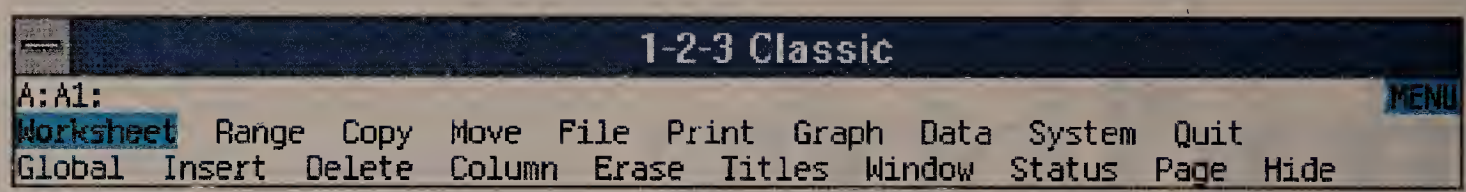


Pure Windows. Pure 1-2-3.

In other words, 1-2-3 for Windows is everything you've asked for. A true Windows program that offers complete compatibility with earlier versions of 1-2-3. Plus, it not only reads and writes all files from 1-2-3 for DOS and Lotus Symphony,® but also all style formats from the Allways™ and Impress™ integrated spreadsheet publishing tools. It even reads files, styles and macros created in Microsoft® Excel.

Better still, with the 1-2-3 Classic menu, you won't need additional training. Because, as we've mentioned, the familiar 1-2-3 menu is always a keystroke away. Which means you can then enter commands the way you would in any previously released version of 1-2-3. So whether you're a current 1-2-3 user or a Windows user, you can jump right in and get to work.

All of which proves that while we were paying close attention to the little things, we weren't overlooking your bigger needs.



Push the slash key and you'll have instant access to the familiar 1-2-3 menu which will appear in a window on your screen.

So see why Lotus 1-2-3 for Windows is more than a great Windows spreadsheet. It's everything you've been looking for in one.

And now you can upgrade from your current version of 1-2-3 to 1-2-3 for Windows and get both 1-2-3 and Ami Pro 2.0 for just $199.* A suggested retail value of $645. For a free auto demo or to order your upgrade directly from Lotus,** call **1-800-TRADEUP, ext. 6042.**

1-2-3 for Windows

Lotus

*Suggested retail price. Offer expires December 31, 1991.

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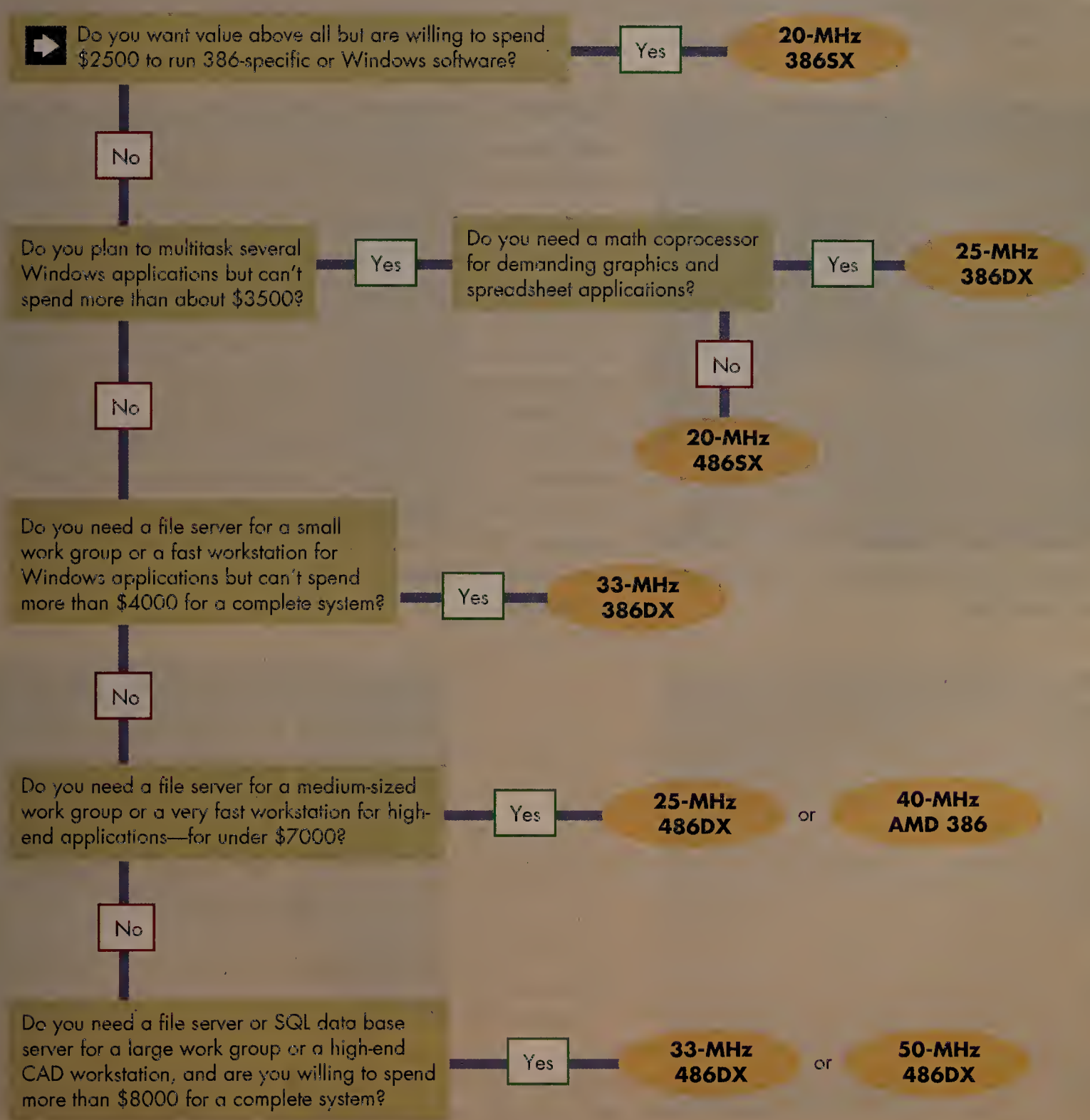
KNOW YOUR OPTIONS

Choosing a Desktop System

The desktop PC market is a morass of different chips running at different clock speeds. Do you need a 20-MHz 386SX or a 25-MHz 386DX? A 20-MHz 486SX or a 33-MHz 386DX?

Technology—and prices—change, and you must constantly reappraise how a system's price, performance, and capacity match up to your real-world applications. A few years ago, we recommended 25-MHz 386 systems only for high-end CAD and server applications. A year from now, we may suggest them as the minimum workstations. Today, these systems fall somewhere in between.

But where exactly do they fall, and how do you know what type of system is right for your job right now? To begin with, let's assume you have a 286 PC and you're ready to move up. But how high? The farther you have to travel in the decision tree below before you answer yes, the deeper you'll have to dig into your pocket.



HP Vectra 385/25PC

PROS: Fast, huge RAM capacity, superb service and support
CONS: Expensive, only three drive bays, no on-site service

Hewlett Packard's Vectra is out of place on a budget shopper's list—the $4686 price is over $2000 more than the Best Buy Eltech. On the brighter side, the system is fast, easy to upgrade, and solidly built. You can install up to 32MB of RAM, but only by using expensive 8MB SIMMS. Expandability is surprisingly limited for such a large system—you get five free slots, but only three drive bays.

HP offers excellent support, both central and through dealers. Their phone lines are open 13 hours a day and they did a good job of answering our questions. HP also has strict policies to ensure that dealers offer good end-user support (though the company doesn't insist on on-site service). The HP Vectra is a good value if top-notch support matters and price doesn't. But half a dozen other systems here beat the HP across the board—on price, expandability, and speed.

The HP Vectra's high price puts it out of range for budget-conscious shoppers.

For the $4862 you'd pay for this IBM PS/2, you could probably buy another vendor's 486.

IBM PS/2 Model 70-A21

PROS: CPU upgrade path, great keyboard
CONS: Very expensive, 6MB fast RAM limit, only three drive bays

At $4862 this is the most expensive system reviewed, and you don't get a lot for your money. Because it's a Micro Channel machine, every board you buy will cost extra (though MCA's software setup makes them easy to configure). While the Model 70-A21 was reasonably fleet running *Windows*, it was slow at *dBASE* and came in last in *Paradox*. Middling scores on other tests earn it a low speed rating.

The Model 70-A21 is also the least expandable system in the review. Fast RAM maxes out at a cramped 6MB, and you get only three free slots and three bays total. If you don't have room for a tape drive—a likely scenario—IBM will sell you an external tape drive, but it costs a staggering *$1995*. The system's one plus: It's one of only two systems that let you upgrade your CPU—but this hedge against obsolescence can't compensate for other drawbacks.

Memorex Telex 7270 Intelligent Workstation

PROS: Switchless setup
CONS: Uses nonstandard SIMMs

The Memorex Telex 7270 is the better of the two Micro Channel systems in this review, so if your office has standardized on MCA it's your first choice. It's more expandable than IBM's Model 70-A21, and you can install standard hard and floppy drives. Also, unlike some Micro Channel clones we've tested, it passed our Micro Channel compatibility tests with flying colors. While it's not particularly fast, it's speedier than the IBM on every test but *AutoCAD* and *Windows*.

Memorex sells direct to its customers (mostly large corporations), and PCs are essentially a sideline to its wide area minicomputer network business. The Memorex is a good value, but only for confirmed MCA users at very large firms.

The 7270 is the better Micro Channel system in this review, but ISA-bus systems are a better deal.

Northgate Elegance 386/25

PROS: Fast, expandable, superior support
CONS: No switchless setup

If you need top performance and impeccable support, this is the system for you. The Elegance 386/25 took first place in two of our six tests, and its service and support package is the best of any mail-order company. No other vendor in this review keeps its support lines open 24 hours a day, seven days a week. Expandability is also tops: You get six free slots, five drive bays, and you can order the system with a 1.2GB hard disk. The Elegance is the most expensive of the three Best Buys in this roundup, but at $3249 it's still quite affordable.

Northgate gives you a choice of three keyboard layouts and three cases (standard, low-rise, and tower), and it bundles a great utility that delivers on-line help for DOS and for the system itself. This is a surefire Best Buy, especially if capable support is crucial.

Top performance and Northgate's superior support make the Elegance 386/25 a Best Buy.

Tandy's 4025 LX is as close as your nearest Radio Shack, but sticker shock may send you back to the street.

Tandy 4025 LX

PROS: Very good expandability
CONS: High price, no switchless setup

The best thing about any Tandy machine is convenience: If you need to get one right away, all you do is run down to the local Radio Shack—and in most places that's a very short trip indeed. Aside from its advantage as an impulse buy, however, the Tandy 4025 LX is notable mostly for its ample expandability. With it, you get four drive bays, all externally accessible, as well as five free slots—though one of them can only hold a half-length board. Otherwise, the 4025 LX is an average machine at a very high $4848 price.

Tandy offers central phone support, though it's only in service for 8 hours a day and you pay the long distance charges. All in all, the 4025 LX is a fairly good value, but given its princely price tag, even if the only computer store in your town is a Radio Shack, you could do better shopping by mail.

Zenith Data Systems Z-386/25

PROS: Huge fast RAM capacity
CONS: Second slowest reviewed, high price, power switch hard to reach

The Z-386/25 is far too slow to justify its $4186 price, even though that includes a 150MB ESDI drive. (Zenith Data Systems doesn't offer anything closer to our 100MB standard configuration—the next step down is a configuration with a 70MB ESDI drive.) Despite its theoretically high-performance drive, the Z-386/25 brought up the rear on our *Windows* tests, and was near the bottom on the rest of the suite.

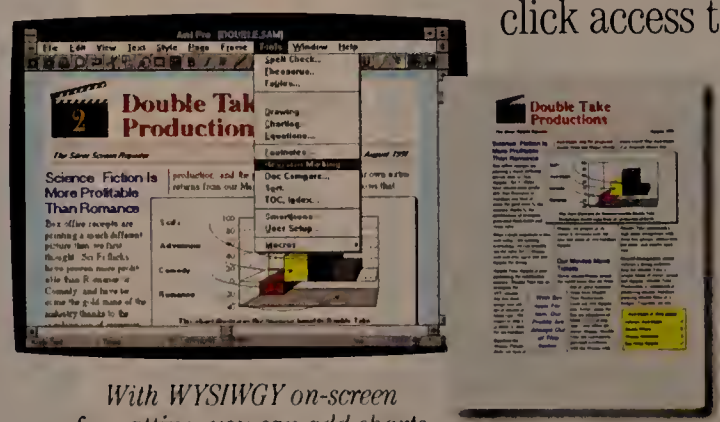
The full-size case can hold six drives, and you can install up to 20MB of RAM on the motherboard, plus 44MB on a special 32-bit board. The power switch is awkwardly located on the rear, a cramped reach in from the corner. All support is through Zenith Data Systems' dealers. Its requirements are fairly strict, especially for its authorized service centers, but there's still no direct support for end users. Add it all up, and you can do better elsewhere.

Despite its ESDI hard disk, Zenith Data Systems' pricey Z-386/25 came in second overall in our performance tests.

Now you can change text, graphics, fonts and fast as you change you

With Ami Pro™ 2.0 for Windows,™ you can now get letter perfect, picture perfect documents in half the time, with half the effort. We call it Visual Word Processing, and it's the fastest, easiest, most direct way to get what's on your mind on paper.

With Visual Word Processing, you work directly on screen with SmartIcons™ that give you one-click access to every word processing feature you need or want, from basic commands to customized procedures. As you make choices in fonts, type sizes, colors and even page layouts, Ami Pro

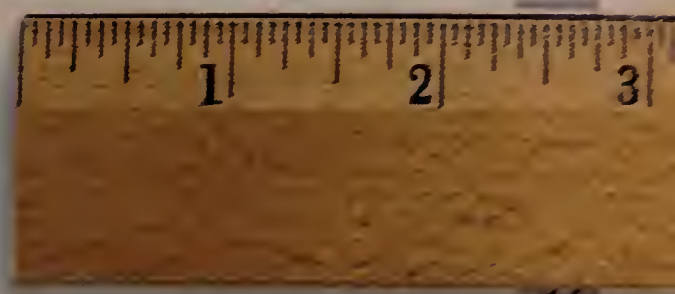


With WYSIWGY on-screen formatting, you can add charts, scanned images, and even free-hand drawings, and then wrap text around any graphic you want.

In Canada call 1-800-668-1509 © 1991 Samna Corporation, a wholly owned subsidiary of Lotus Development Corporation. All rights reserved Ami Pro is a trademark of Samna Corporation Windows is a trademark

Your format as mind.

On-screen formatting, full free-hand drawings and clip-art, text that automatically wraps around graphics and a wide range of page and paragraph layout controls all help you create more powerful and persuasive documents. And Ami Pro even comes with dozens of pre-formatted Style Sheets so you can get professionally designed documents as fast as it takes you to type in your copy.



One click and up pops a ruler, which allows you to instantaneously move from a one to two column format and adjust indents, margins and tabs right on screen.

Naturally, Ami Pro 2.0 reads and writes the most popular word processing file formats and is integrated with the entire suite of Lotus® Windows applications.

Only Ami Pro 2.0 gives you the power to change your mind in an instant. And that will change the way you look at word processing forever.

And right now, we have a special offer if you're currently a 1-2-3® user. Upgrade from your current version of 1-2-3 to 1-2-3 for Windows and get both 1-2-3 and Ami Pro for $199.* A suggested retail value of $645.

See your participating reseller for more information or call 1-800-831-9679, ext. 6031 for a free working model.

guides you every step of the way with visual cues so you can easily create everything from simple memos to complex reports.

Award-winning Ami Pro not only enhances the way you work, it also enhances the work you create.

"The expanded features and interface improvements put the program head and shoulders above other Windows word processors like Word for Windows, [beta] testers said... There's no comparison."
—PC Week (7/1/90)

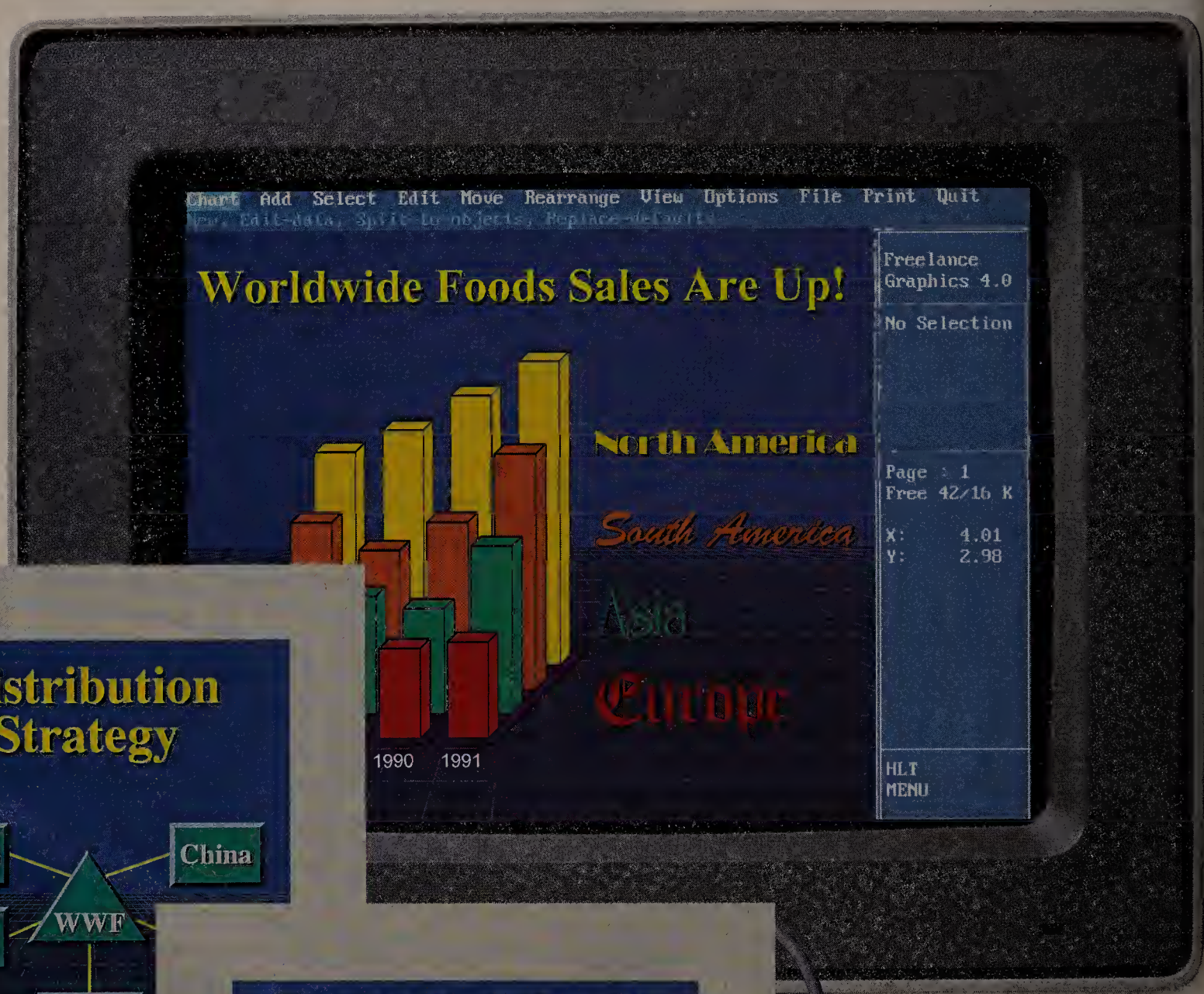
Introducing Ami Pro 2.0 for Windows

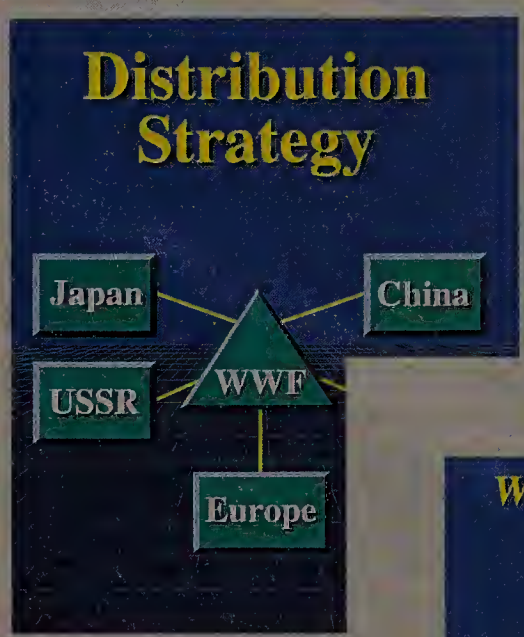
Lotus

Microsoft Corporation. SmartIcons is a trademark and Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. *Suggested retail price. Offer expires December 31, 1990.

Circle 175 on reader service card

Introducing the new
It will create your nex
Not to mention





Automated Smart Features *make it easier than ever to produce everything from simple word charts to impressive flow charts, diagrams and other business drawings.*

The new Freelance Graphics for DOS offers a WYSIWYG (what-you-see-is-what-you-get) environment where you work with actual colors and fonts while you're creating your graphics. And with the mouse you can do it all in record time.

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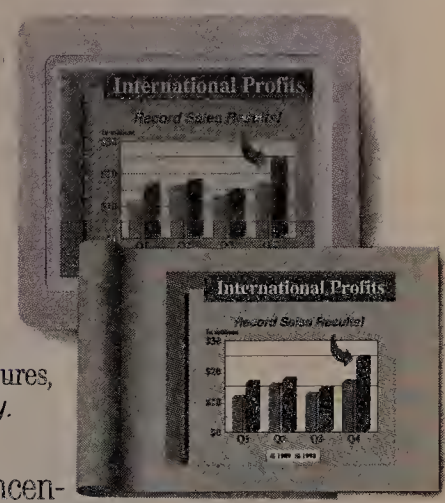
'reelance Graphics. resentation beautifully. utomatically.

Now there's an even better version of Freelance® Plus, the award-winning graphics program praised by *PC Magazine* and *PC World*. It's so improved, in fact, we even changed its name. Introducing Freelance Graphics™ 4.0. The best presentation graphics program for DOS.

For starters, we've added a graphical WYSIWYG environment. Which means you'll work with actual colors and fonts while creating your graphics. Plus, you'll know what your output will look like before you print.

And with the mouse you'll do it all—from executing menu commands to moving a chart—in record time.



Only Freelance Graphics, with its unique automated Smart Features, *can turn your rough ideas into a smooth presentation this easily.*

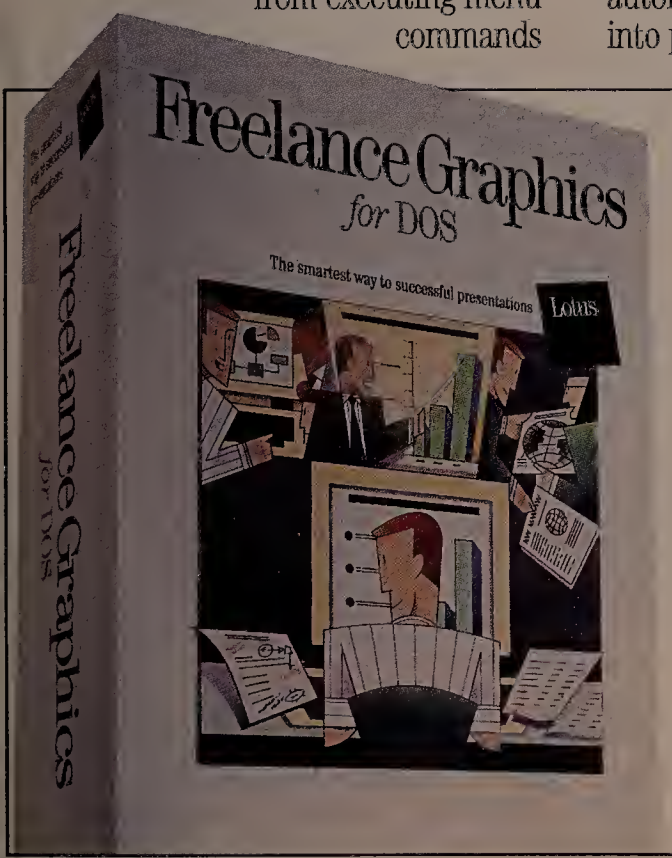
Yet what's really unique about the new Freelance Graphics is its *Smart Features*. Unlike other DOS graphics programs, its hard-working *Smart Features* automate the process of turning your ideas into persuasive presentations. So while you're concentrating on what you want to say, Freelance Graphics will take care of how it looks. Whether you're creating slides, overheads, or hard copy, in color or black-and-white.

Here are a few of its *Smart Features:*

Portfolio, a built-in presentation manager, helps you organize and prepare your presentation; a Text Chart Outliner,[1] complete with a spell-checker, creates stacks of text charts in seconds; Auto-charting makes weekly or monthly reporting a snap by printing hundreds of up-to-date charts with a single command; Smart Chart Update automatically recomposes a chart whenever the data changes...even if you've added annotations or symbols; and over 1,000 Pre-drawn Symbols and Design Backgrounds.

All of which means you can now create an incredibly impressive presentation. With incredible speed and ease. The new Freelance Graphics.

It could actually have you looking forward to your next presentation.



Upgrade to Freelance Graphics now and you won't just save time. You'll save money.

Starting October 1, we're offering—direct from Lotus®—a price of just $119.00[2] for 1-2-3® users or anyone upgrading from an earlier version of Lotus Freelance or Graphwriter, or any other eligible[3] graphics program, including Harvard Graphics.

Plus, you'll be covered by the Lotus Technology Guarantee. Which means a guaranteed price of just $49.00 on our upcoming Freelance Graphics for Windows™ product.

For information or to purchase your upgrade directly from Lotus, call us.[4] Please have your credit card and eligible product package ready.

1-800-TRADE UP, ext. 6170.

[1]*Developed by Symantec Corporation, especially for Freelance Graphics.* [2]*Offer expires December 31, 1991.* [3]*Eligible products for upgrade offer include all versions of the following products: Lotus Freelance Plus or Graphwriter, Harvard Graphics, DrawPerfect, Applause II/Draw Applause, Graph Plus, Charisma, Microsoft Chart, Pixie, Gem Series, ChartMaster, Diagram Master.* [4]*Freelance Graphics Upgrade also available at participating Lotus resellers.*

Freelance Graphics for DOS

Lotus

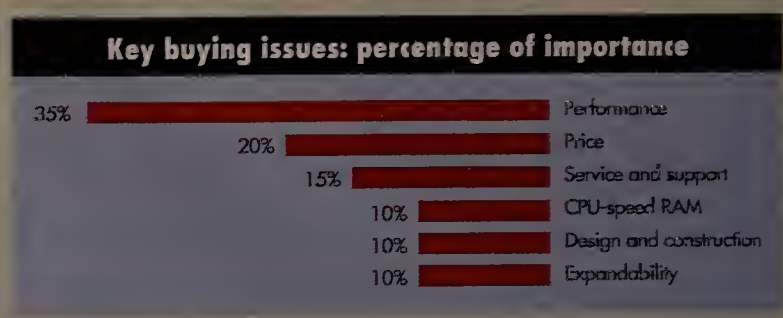
EXECUTIVE SUMMARY

386 25s: Catch 'em While You Can

Eltech, Everex, and Northgate are the hottest of today's sizzling 25-MHz 386 bargains.

BEST BUY

In six months to a year, many of these Windows-capable PCs will be history as more powerful 33-MHz 386 systems drop in price. But in the meantime, smart shoppers will find some super deals. The bargain Best Buy is the **Eltech Model 9870**, which sells for only $2599; the Best Buy **Everex Step 386/25** offers super expandability; the **Northgate Elegance** wins a Best Buy with its top speed and superb support.



Excellent ★★★★
Good ★★★
Fair ★★
Poor ★

	Reader service number	Performance	Price	Service and support	CPU-speed RAM	Design and construction	Expandability	Overall value
Eltech Model 9870	605	★★★★	★★★★	★★★½	★★★½	★★★½	★★★★	★★★★
Everex Step 386/25	607	★★★★	★★★½	★★★½	★★★★	★★★★	★★★★	★★★★
Northgate Elegance 386/25	612	★★★★	★★★	★★★★	★★★½	★★★★	★★★★	★★★★
Acer 1100/25	601	☆☆☆½	☆☆☆	☆☆☆½	☆☆☆☆	☆☆☆½	☆☆☆½	★★★½
Dell System 325D	604	☆☆☆☆	☆☆½	☆☆☆☆	☆☆☆½	☆☆☆☆	☆☆☆½	★★★½
Compaq Deskpro 386/25e	603	☆☆☆	☆½	☆☆☆	☆☆☆½	☆☆☆½	☆☆☆	★★★
Epson Equity 386/25 Plus	606	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆½	★★★
HP Vectra 385/25PC	609	☆☆☆½	☆½	☆☆☆☆	☆☆☆☆	☆☆☆	☆☆½	★★★
Memorex Telex 7270	611	☆☆½	☆☆	☆☆☆☆	☆☆☆½	☆☆☆½	☆☆☆½	★★★
Austin 386/25 WinStation	602	☆	☆☆☆☆	☆☆☆☆	☆☆	☆☆☆½	☆☆☆½	★★½
FastMicro FastData 386/25	608	½	☆☆☆☆	☆☆☆½	☆☆☆½	☆☆☆	☆☆☆☆	★★½
Tandy 4025 LX	613	☆☆☆	☆	☆☆☆	☆☆☆½	☆☆☆	☆☆☆½	★★½
IBM PS/2 Model 70-A21	610	☆☆	☆	☆☆☆	☆½	☆☆☆½	☆½	★★
Zenith Z-386/25	614	½	☆☆	☆☆☆½	☆☆☆☆	☆☆☆	☆☆☆½	★★

Overall value is calculated by multiplying each category rating by the category's weight percentage, summing the results, and rounding to the nearest half number.

WHERE TO BUY

Acer 1100/25
Acer America
401 Charcot Ave.
San Jose, CA 95131
408/922-0333,
408/922-0176 (fax)
LIST PRICE: with 2MB RAM, 1.2MB floppy, IDE, one parallel and two serial ports, 101-key keyboard, mouse, DOS 5.0, Windows 3.0 $2995; with 4MB RAM, 100MB disk, VGA, color monitor $4724
ACCESSORIES: 1MB RAM $110, 4MB RAM $390; unpopulated 32-bit fast RAM expansion card $420; 1.44MB floppy $125; 14-inch noninterlaced 1024-by-768 color VGA monitor $995; OS/2 1.21 $249
Reader service no. 601

Austin 386/25 WinStation
Austin Computer
10300 Metric Blvd.
Austin, TX 78758
800/833-3657,
512/454-1357 (fax)
LIST PRICE: with 2MB RAM, 1.2MB or 1.44MB floppy, IDE, 85MB hard disk, one parallel and two serial ports, mouse, 101-key keyboard, DOS 5.0, Windows 3.0 $2190; with 4MB RAM, 125MB disk, VGA, color display $2615
ACCESSORIES: 2MB RAM $198; floppy drive $79; 120MB tape drive $299
Reader service no. 602

Compaq Deskpro 386/25e
Compaq Computer
20555 SH 249
P.O. Box 692000
Houston, TX
77269-2000
800/231-0900
(dealer locator)
(continues)

What gives you icons and folders, is easier than Windows, and comes with $25 back?

NewWave for Windows

ntil now, if you wanted a PC sktop that's as easy to use a Mac, you've been left in e dark.

ut now you can add HP ewWave to Windows for a mpler desktop. It turns all ur DOS and Windows files d programs into icons. Then s you group them in folders, project, the way you do on ur real desktop.

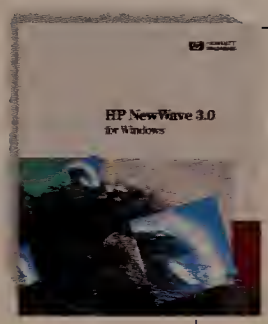
file and its program are auto-atically linked. They open multaneously. You save steps, d never have to worry about where things are on your PC.

The result? Your work is easier to organize and faster to complete. All for about the cost of a mouse.

Best of all, this is just one of the advantages that made NewWave *PC Magazine's* "Environment of the Year."

Buy it at your dealer today. Our $25 rebate offer is about to end.

HEWLETT PACKARD



Buy now and get $25 back

Purchase HP NewWave between 9/2/91 and 11/29/91, then send this coupon, original product registration card, and your original sales receipt to HP Program Awards Center, P.O. Box 59058, Minneapolis, MN 55459-0058. Must be postmarked by 12/16/91.* Suggested Retail Price $195. Actual price may vary.

Name & Title

Company Phone

Street Address

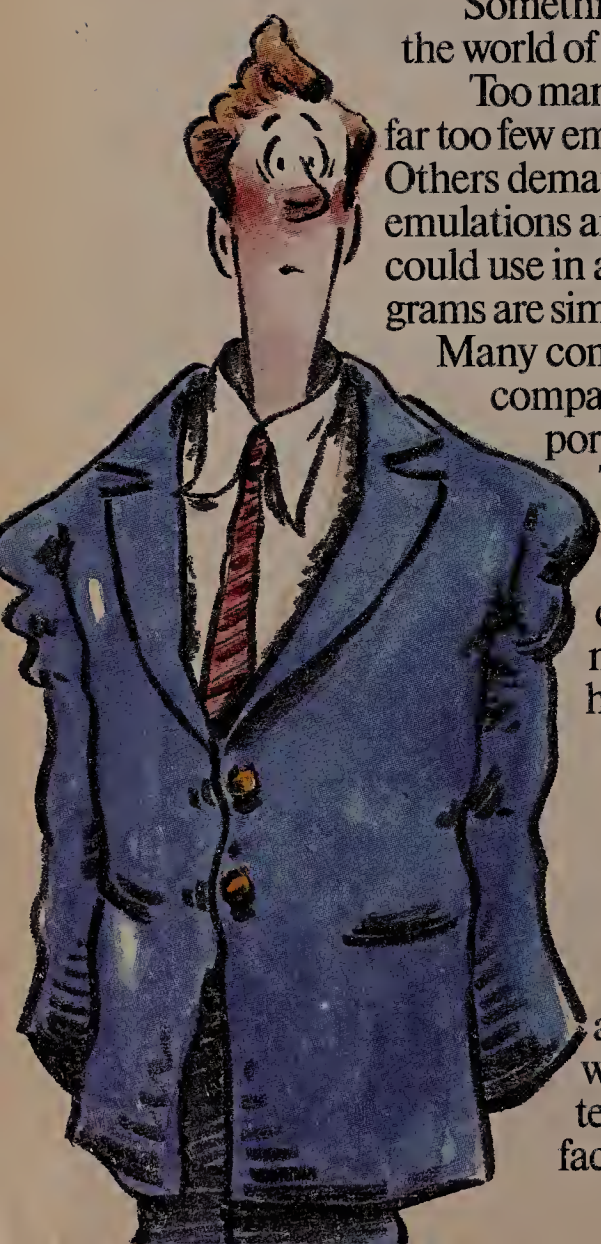
City, State, Zip

Want to learn more? Get our interactive demo disk ($3.95 handling charge)

Call 1-800-345-9111 x 23B2

*lers of HP products and their employees not eligible. Allow 6-8 weeks for your check to arrive.

Why Some Communications Software Don't Talk Real Good.



Something isn't quite right in the world of PC communications... Too many comm programs have far too few emulations and protocols. Others demand big bucks for more emulations and protocols than you could use in a lifetime. A lot of programs are simply shareware in a box. Many come from such small companies that the tech support is less than supportive. There's even one surprisingly well-known comm package which completely shuts up the minute you attempt a high-speed file transfer.

No Size Fits All.

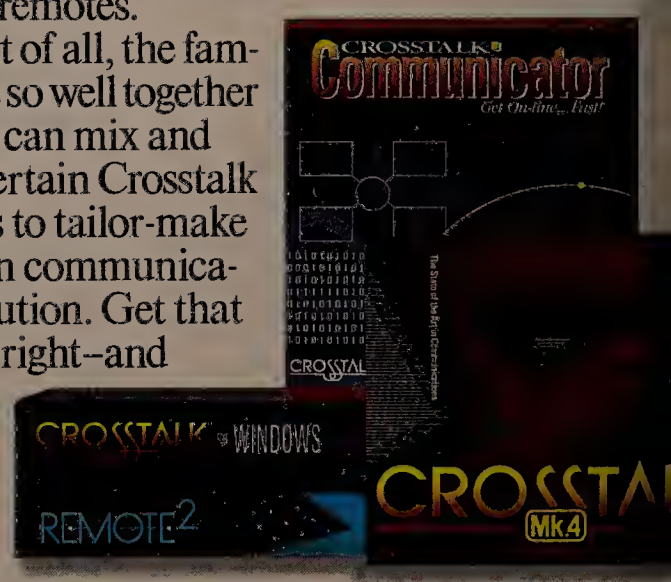
To cap it all off, an appalling number of software manufacturers will tell you–with a straight face–that a single, "one size fits all" product is going to solve every communications need for every individual in every situati Well it won't. We know. We invented the category.

All In The Family.

More importantly, we've developed the only truly workable solution for all the PC communica tions requirements out there. But it's not a disk.

It's a family. A family of communications so tions that's gone beyond Crosstalk® XVI and now ranges from high powered "programmers" progra to economical executive models. To Windows™ so ware. To remotes.

Best of all, the family works so well together that you can mix and match certain Crosstalk products to tailor-make your own communications solution. Get that mix just right–and you're looking at major cost savings.



Top Talkers

Compare the "stars" from *Software Digest.*

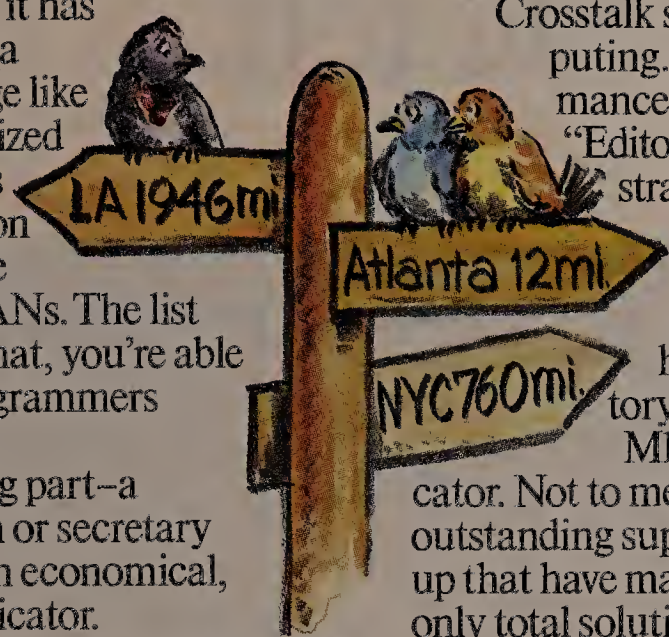
★★★★ Crosstalk Mk.4
★★★ HyperAccess/5
★★★ Mirror III
★★★ Smartcom Exec
★★★ Crosstalk for Windows
★★★ Smartcom III
★★ Procomm Plus

Look Who's Talking.

Take Crosstalk Mk.4 and Crosstalk Communi-
r. In the hands of a programmer, Crosstalk Mk.4
perform miracles. After all, it has
CASL™ scripting language (a
erful programming language like
Pascal). Plus, highly specialized
lations (from VT emulators
TTERM). Data transmission
s up to 115,200bps. Multiple
ions. Modem sharing on LANs. The list
s on. With capabilities like that, you're able
reate the kind of scripts programmers
e home about.

Yet–and this is the amazing part–a
npany executive or salesman or secretary
run that very same script on economical,
y to use Crosstalk Communicator.

And while Crosstalk Communicator is the ideal
nplement to Crosstalk Mk.4, it's a powerful little
kage that can also fly solo. It's simple enough to
figure in three minutes, yet supports virtually all
dems plus direct connections. It has a Learn fea-
. The most popular protocols and emulations. Even
configured log-in scripts for information services
BBSs that can get you on-line with a single key-
ke. Calls to other systems like a VAX® are made
n surprisingly little set-up. In fact, the built-in diag-
tics of Crosstalk Communicator "intelligently"
all your installation and set-up for calls.



Crosstalk Mk.4 "does almost everything and does it right."
"Crosstalk Communicator...for the price, it's hard to beat."
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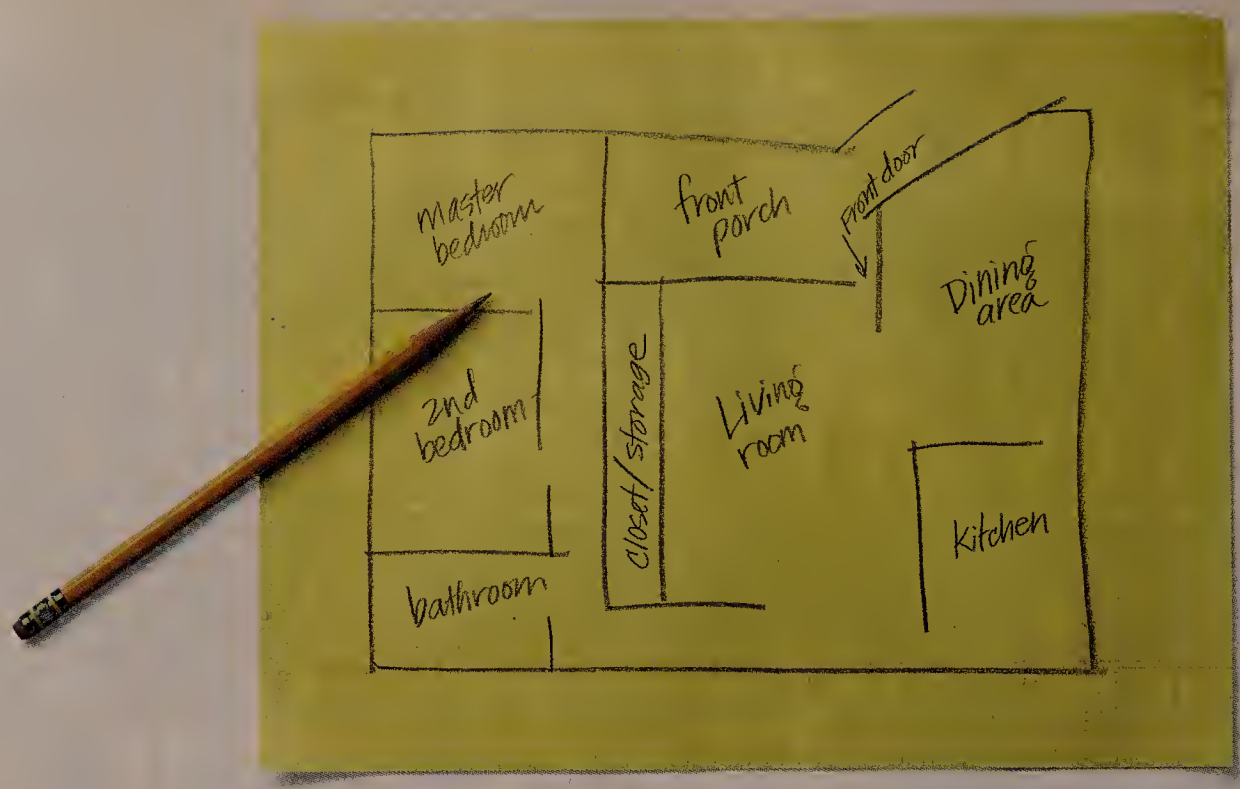

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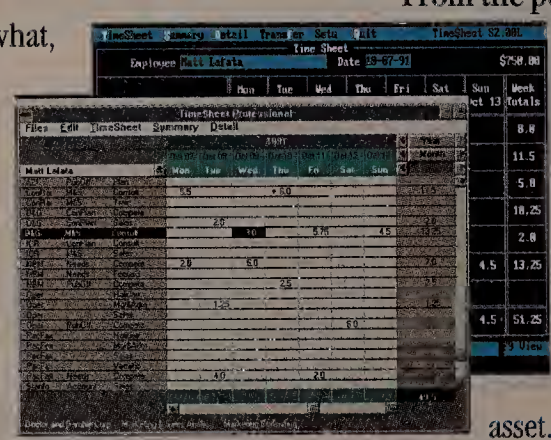

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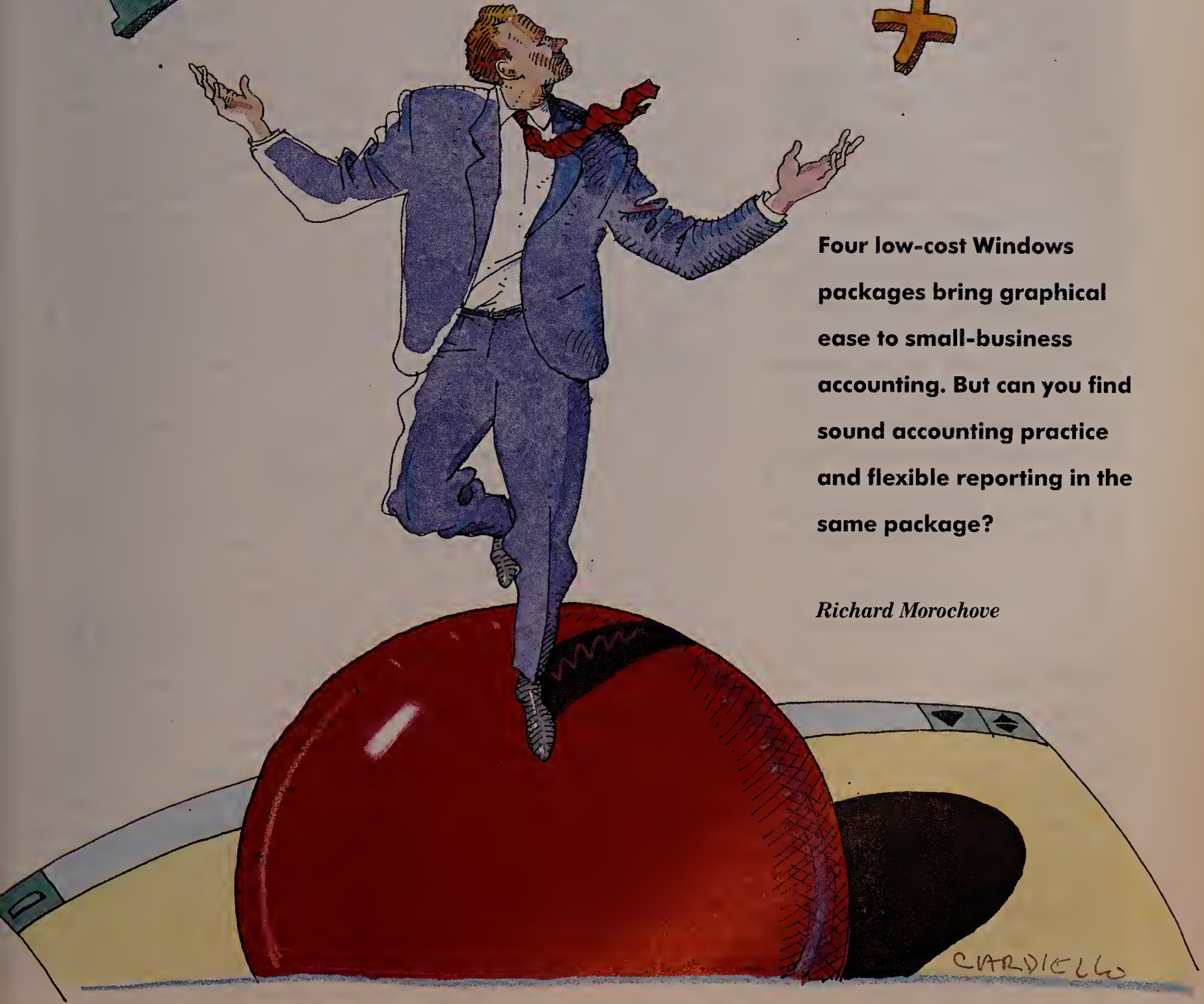
Windows Balances The Books

Four low-cost Windows packages bring graphical ease to small-business accounting. But can you find sound accounting practice and flexible reporting in the same package?

Richard Morochove



Your company dutifully logs the day-to-day transactions that are the lifeblood of your business, if only because the IRS wouldn't have it any other way. You can give those ledgers to an accountant, who will keep things in order and occasionally tell you where your business stands. But why not also use those numbers as a data base for tracking and analyzing your company's finances?

So goes the persuasive argument for small-business accounting software. Designed primarily for companies switching from manual to computerized accounting, these packages promote accuracy, automate repetitive tasks, and—most important—generate a variety of reports that help you keep your finger on the pulse of your business.

Small-business accounting software typically caters to companies with less than $5 million in annual revenue, a moderate to light transaction volume, and a bookkeeping staff of one or two people—if there's a bookkeeping staff at all. Such packages generally cost only about $200 for general ledger, accounts payable, and accounts receivable modules all rolled into one. By contrast, high-capacity packages that track more profit centers, generate more types of reports, and readily accommodate a networked accounting department can easily cost $1500 to $1800 for the same three modules.

Predictably, ease of use distinguishes most entry-level accounting programs. In this review, we focus on four packages that bring the graphical ease of *Windows* to small-business accounting.

Task Mastering

All accounting involves five basic tasks. To find out how well the four reviewed programs help with these jobs, we tested them in the following activities:

Setting up books The first thing you do with a new accounting program is establish ledger accounts and enter basic business information. Look for a healthy collection of sample charts of accounts and flexible fiscal periods.

Buying Smart: Windows Accountability

A good small-business accounting program may not run your business for you, but it'll sure help. The key is to find one that's customizable, easy to use, and adheres to generally accepted accounting controls.

You can use any of the programs in this roundup to total the numbers that make up your books, but a spreadsheet, a calculator, or an abacus could handle that job. To manage your business successfully, you must understand the factors that produce your bottom line, and that requires more than simple math. Look for displays and reports that help you analyze your numbers, as well as add and subtract them, so you'll have the information you need to make profitable decisions. In addition, tools for automating routine tasks will save you time and reduce errors.

EASE OF USE

Nothing makes accounting easy, but a well-designed *Windows* program can help. Look for logically grouped commands and mnemonic keyboard shortcuts. A good, well-indexed manual and an introduction to accounting fundamentals can go a long way toward demystifying bookkeeping.

SETTING UP BOOKS

The accounts required by a retailer, a small manufacturer, and a consulting practice vary tremendously, so your first job is acquainting your program with your business. Most accounting programs come with a few preset, empty setups—called start-up charts of account—that make this job easier. The more predesigned charts a program has the better your chance of finding one you can use with minimal customization.

If your company uses the 12 calendar months as its fiscal periods, you'll have no trouble with any of these programs, but you may prefer to divide the year into more periods to better monitor your selling cycle. The more fiscal periods your program supports, the more freedom you will have.

The ability to handle cash-basis accounting can also prove useful. Most companies use the accrual basis—they recognize profit when they invoice customers. Cash basis accounting recognizes profit when customer payments are received. This method is simpler for novices, but both your tax codes and your CPA will have to approve its use.

TRACKING REVENUES

Your accounting program should support as many customers as you're likely to have. Customization is important: If you can design your own invoices and customer statements, you can print precisely the information your customers need to see.

Other features may also help you collect on accounts. Setting up customer-specific payment terms lets you fine-tune your billing methods to suit a variety of clientele, for instance, to bill government accounts differently than corporate ones. If you add finance charges to your bill,

you'll want them computed automatically. When customer payments are late, you'll want a program that can automatically print age-dependent dunning notices to let them know you're concerned. And when you regularly bill someone a fixed amount—say, a monthly maintenance charge—a program that supports recurring invoices will make your life easier.

MANAGING EXPENDITURES

This is the flip side of Tracking Revenues, and what you'll want from a program is similar. Once again, the program must support as many vendors as you're likely to have, let you customize check and payment advice forms, support vendor-specific payment terms, and automate recurring payments, such as rent.

But the job of paying bills has its own requirements. If some of your vendors offer a discount for prompt payment, you'll want your program to compute this automatically. You'll also want to predict how much money you'll need to pay out in the next month or two—a good accounting program can do this for you in the form of a cash requirements report.

OVERSEEING BOOKS

Separate revenue and expenditure records won't tell you how your business is doing. For that you need a general ledger, which combines summaries of your revenues and expenditures with data that doesn't directly affect cash, such as the depreciation of your office furniture and equipment. Look for a program that lets you display an entire transaction while you enter it—you'll make fewer mistakes if you can see the debits and credits at the same time.

You'll want to keep each ledger entry in its proper fiscal period, even when the bill arrives one or two periods late, so the more fiscal periods your program can keep open, the better. The ability to track multiple departments lets you see how each one is doing, and if you can maintain budget data and compare it to your actual results, you have a better chance of staying in the black.

REPORTING FINANCES

Printing financial statements is what accounting is all about—at least to your CPA. If you can customize your statements, developing your own subtotals or column presentations, you and your accountant will get the report you both want. Look also for the ability to view your financial position graphically, as a bar or line chart.

All the programs prepare a balance sheet to show your financial position at a given time and an income statement to show profit or loss for the year to date. Less common, but also useful, are a statement of changes in your financial position, which shows the flow of cash in and out of your business for the year to date, and a report that reconciles your checks to your bank account.

A computerized accounting system lets you "slice" the financial pie many ways, helping you pinpoint sales trends and the reasons for your success or lack of it. All the programs reviewed here let you analyze sales by customer, but look also for one that lets you examine sales by product and territory.

And since some reports may contain sensitive information, password protection is important if more than one person will use the accounting system. All the programs let you lock people out of the entire system, but module-level password protection is preferable, as it lets you restrict access to selected parts of the program.

PRICE

Compared to professional-level accounting packages, which can cost $4000 by the time you've purchased every module you need, these programs are bargains. But some are greater bargains than others. All the amounts listed here are list prices; you can expect to pay 25 to 40 percent less in a store.

SERVICE AND SUPPORT

When you get stuck, there's no substitute for knowledgeable help at the end of a phone line. To test technical support, we called each vendor three times, asking questions of varying technical complexity, and noted the timeliness and accuracy of the answers. We also factored in support policies, such as hours, toll-free lines, and BBS and fax support.

Tracking revenues This is the fun part of the job—billing your customers and collecting their payments. Superior programs age past-due accounts, let you customize the detail on your billing, and even print collection letters.

Managing expenditures Well, accounting can't be all fun—you have to spend money to make money. A program should help you track your expenses, and let you customize checks and payment advice forms. A cash requirements report that forecasts upcoming payables can head off nasty surprises.

Overseeing books You'll need to bring your revenue and expenditure results together, and the general ledger is the place to do it. Here you should be able to view entire transactions as you enter them, to avoid error. Better packages let you compare budget versus actual results and keep multiple fiscal periods open.

Reporting finances Finally, you have to turn all this information into the reports both you and your accountant need. You'll want customized financial statements, sales analysis reports, and statements to send to your bank.

Disappointingly, none of the tested packages takes full advantage of the *Windows* environment. *Windows* users should learn the programs easily, but people new to the environment will find DOS packages just as easy. Wishes for sophisticated reporting and graphing modules to help analyze business performance remain unfulfilled.

A variety of reports let you keep your finger on the pulse of your business.

In fact, the first four *Windows* entrants don't match the power of similarly priced DOS programs. If you're not already a *Windows* user, you'll be better off with a package like Manzanita's *BusinessWorks* or M-USA's *Pacioli 2000*, the two text-based Best Buys from our last low-end accounting roundup ("Budget-Wise Accounting," November 1990).

We should note that this is only the first batch of *Windows* accounting programs. The next round should see packages that both match the power of their DOS counterparts and fully exploit the *Windows* environment.

Richard Morochove is a chartered accountant and president of Morochove & Associates Inc., a Toronto-based consulting firm specializing in accounting software.

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DOS VERSION

Circle 211 on reader service card

Accpac Simply Accounting for Windows 1.0A

PROS: Easy to use, terrific introduction-to-accounting manual

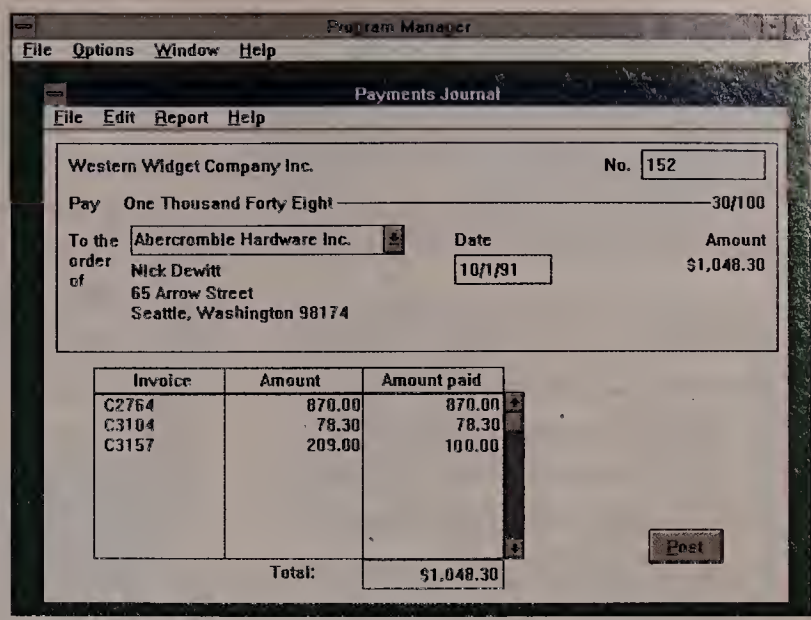
CONS: Few revenue or expenditure options, rigid reports, no graphics

WINDOWS If you're new to accounting—or a little rusty—*Accpac Simply Accounting*'s well-designed menus and first-rate documentation will get you going fast. If your needs are simple—for instance, if you sell only one line of products—*Simply Accounting* is a good pick.

Setting up your books could hardly be easier. You can choose from six basic start-up charts or use the complete books of a fictitious company as your basis. If you aren't too sure about your debits and credits, you'll welcome the clearly written documentation, complete tutorial, and comprehensive paperback mini-course on accounting fundamentals—the best in the roundup. The menus are well organized and easy to navigate, and the data entry screens resemble their hard-copy counterparts.

But *Simply Accounting* just doesn't give you many options for handling revenues and expenditures. If companies want you to bill them in some specific way, forget it—you can't customize invoices, statements, or even payment terms. You must print checks one at a time—not in a group like most accounting programs allow. Reporting capabilities are slight, and strangely, this *Windows* version lacks the financial graphics capabilities available with the text-based DOS *Accpac*. Password protection, on the other hand, is first-rate.

Accpac Simply Accounting isn't as versatile as its competition, but for the novice, especially one with modest needs, *Simply Accounting* is the best choice.



Paying your bills with Accpac Simply Accounting for Windows is as easy as filling out a check form.

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Before he takes off, Mike uses his PC and Calendar Creator Plus* to merge his busy flight and ground schedules into one great-looking calendar. So he and his friends and associates always know what he's up to. **Time management is a breeze.** Schedule personal appointments, departmental meetings and the office conference room in minutes. Plan trade shows and keep track of a traveling sales staff. Merge any combination of individual schedules on your PC or LAN to print one master calendar. All this in nine calendar formats, including pages for Day-Timers® and other organizers. Put your organization on auto pilot. With Calendar Creator Plus 4.0.

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Circle 213 on reader service card

Crystal Accounting 4.0

PROS: Highly customizable, tracks multiple departments, easy to use

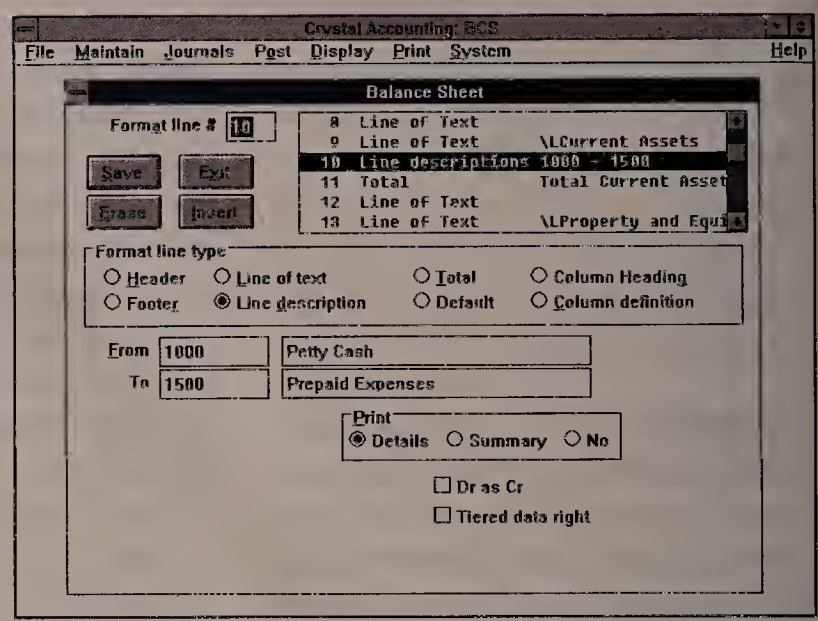
CONS: Lacks graphics

WINDOWS Peachtree's *Crystal Accounting,* a seriously revamped version of *Bookkeeping by Design,* is almost as easy to use as *Simply Accounting* but considerably more powerful—the best choice for all but the most inexperienced users.

Learning *Crystal* takes a little more time than learning *Simply Accounting.* The menus aren't as easy to master or navigate, and the forms are a bit more crowded and confusing, but that's part of the price of a more complex program. Even the manual's introduction to accounting nearly matches *Accpac*'s in quality.

Crystal Accounting allows you to monitor revenues and expenditures closely. You can set up recurring invoices and payments and even include dunning notices on customer statements. But *Crystal* can't customize invoices, customer statements, or checks.

The program's batch orientation should suit midsize companies. Transactions are held in a separate file and then posted to the program in a batch, preventing the system slowdown that constant transaction processing causes.



Crystal Accounting's comprehensive report writer lets you customize your financial statements.

The program does better than most at reporting. It's the only package reviewed that generates a statement of changes in financial position—a key barometer of your company's fiscal health. In addition, you can print sales lists in invoice number order, though not by territory or product.

Crystal Accounting doesn't quite have what it takes to win a *PC World* Best Buy. But if you're looking for a balance between power and simplicity, this is the program to buy.

GOLD UP

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invested in XTree for improved prod
tivity because it's the industry's mos
logical and easy-to-use high perform
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management utility that builds on th
strengths of every MS-DOS package,
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power and speed to enhance your P
performance and productivity, inclu
a wealth of viewers – over 50 for
spreadsheets, database, word proce

XTree Easy, the file and disk management choice for laptop users and those new to computing.

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AllSafe, the comprehensive se
product that includes virus pro
access control and security rep

M.Y.O.B. 2.0

PROS: Contact manager, flexible revenues and expenditures, good support
CONS: Unconventional interface

WINDOWS *M.Y.O.B.* stands for *Mind Your Own Business*, and—if you're willing to master a tricky interface—Teleware's program will help you do just that. You can do more with revenues and expenditures with *M.Y.O.B.* than with any other package here.

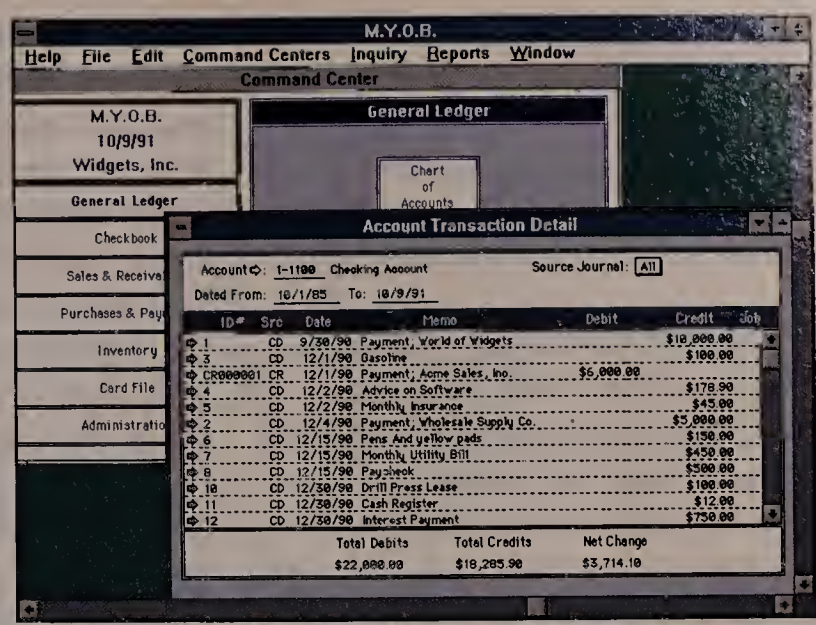
M.Y.O.B. will leave experienced *Windows* users cursing. The menus, cursor keys, and dialog boxes just don't behave the way they do in other *Windows* programs. For instance, the first menu option is Help instead of File. And the interface is clumsy as well as unconventional; for example, many dialog boxes lack a simple 'OK' button.

To make matters worse, the documentation is written for the Macintosh version. It's bad enough when the tutorial tells you to select a company file that doesn't exist, but when it warns that 'You will need your Macintosh...whenever you use this tutorial', it's downright unsettling (don't worry, your PC will do just fine).

Luckily, whenever we called Teleware's technical support line, we received prompt and usually accurate answers. *M.Y.O.B.* is a powerful tool, especially for handling revenues and expenditures. It's the only program in the roundup, for instance, that lets you customize check and payment advice formats. And *M.Y.O.B.* turns out the best-looking graphs in the roundup.

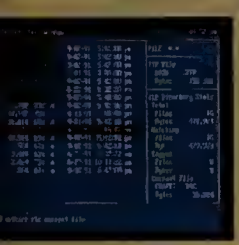
Best of all, this program has what amounts to a built-in contact manager, giving you immediate access to phone numbers for customers who are behind in their payments or other business associates you may want to call.

Between the unusual interface and poor documentation, *M.Y.O.B.* is a challenge. But if you need full flexibility in your bookkeeping, it's worth the effort.



In M.Y.O.B., the lack of an 'OK' button means you often have no way of terminating an action other than by closing the window.

ALF. REST OF MARKET UNCHANGED.



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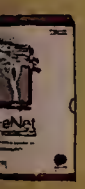

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Circle 319 on reader service card

Sybiz Windows Accounting 1.4

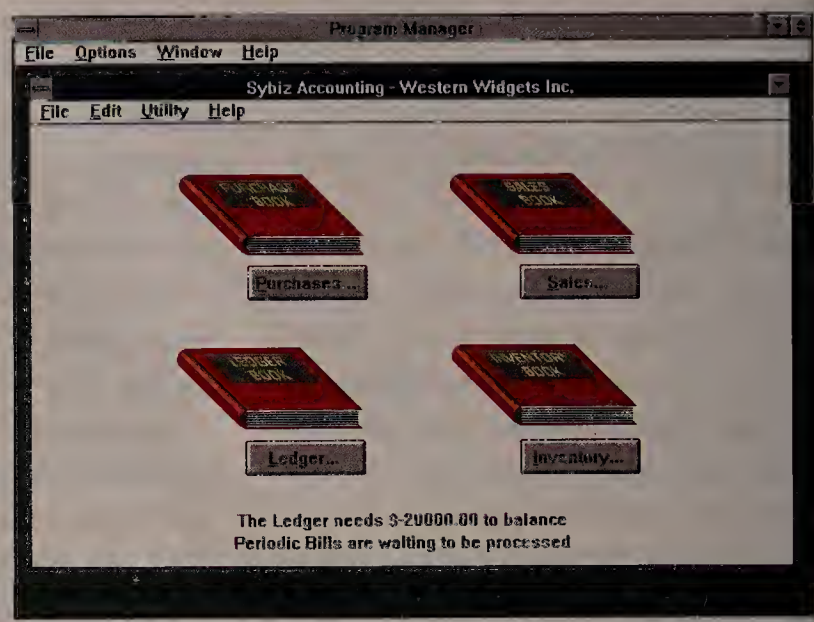
PROS: Unlimited support, best cash requirements reporting

CONS: Dangerous one-sided ledger entries

WINDOWS Brown-Wagh Publishing's *Sybiz* isn't the best program to trust your business to. It's acceptable for most tasks, but because it lets you enter one-sided transactions, *Sybiz* can be a trap.

Sybiz' graphical book metaphor helps you organize your accounts, but the documentation is wanting. The manual is skimpy and ambiguous and on-line help is the worst in the roundup.

Worse yet, by letting you enter one-sided ledger transactions, *Sybiz* exposes you to some serious problems. Traditionally, every accounting transaction has two sides, a debit and a credit, that must match for the books to balance. To protect you from making incomplete entries, most accounting programs routinely force you to enter both at once; with *Sybiz*, such good working habits are left strictly up to you, practically guaranteeing that you'll have out-of-balance books. *Sybiz* will warn you that the books are out of balance, but finding out where is no mean feat.



Sybiz lets you post unbalanced entries, resulting in serious errors you'll have to deal with later.

On the positive side, once you've bought *Sybiz*, Brown-Wagh won't forget you. This is the only program in the roundup that gives you free telephone support for the life of the product.

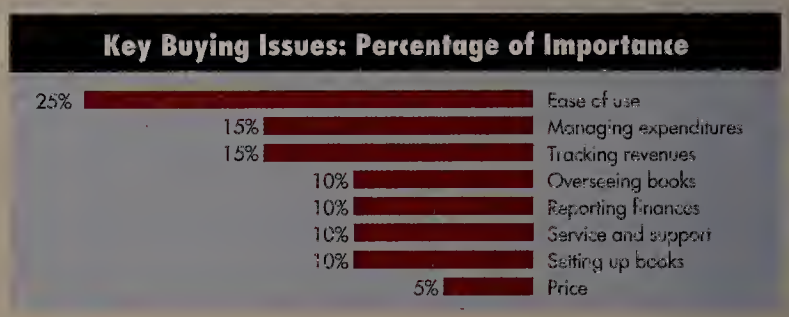
And when it comes to generating a cash requirements report, nothing beats *Sybiz*. All the programs monitor what you're likely to be paying, but only *Sybiz* takes into account the money you're likely to receive.

If you're operating on a thin margin, *Sybiz*'s excellent cash requirements reports may sound tempting. You'll do better, however, with a program that does more to promote accuracy.

EXECUTIVE SUMMARY

Windows Accounting: Close But No Cigar

There's no Best Buy because no single program proves best at handling all important accounting tasks. Accpac Simply Accounting is the easiest program to use, M.Y.O.B. the most powerful, and Crystal Accounting the best compromise between simplicity and strength.



Excellent ★★★★
Good ★★★
Fair ★★
Poor ★

	Reader service number	Ease of use	Managing expenditures	Tracking revenues	Overseeing books	Reporting finances	Service and support	Setting up books	Price	Overall value
Crystal Accounting 4.0	666	☆☆☆½	☆☆☆½	☆☆☆½	☆☆☆☆	☆☆½	☆☆½	☆☆☆	☆☆☆½	★★★½
ACCPAC Simply Accounting 1.0A	665	☆☆☆☆	☆☆½	☆☆☆	☆☆½	☆☆	☆☆	☆☆☆☆	☆☆☆☆	★★★
M.Y.O.B. 2.0	667	☆½	☆☆☆☆	☆☆☆☆	☆☆☆	☆☆½	☆☆☆	☆☆½	☆☆☆½	★★★
Sybiz Windows Accounting 1.4	668	☆	☆☆☆	☆☆☆	☆	☆☆	☆☆☆	☆☆	☆½	★★½

Overall value is calculated by multiplying each category rating by the category's weight percentage, summing the results, and rounding to the nearest half number.

Circle 198 on reader service card

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Computer Buyers Guide, 386SX Product Review

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PC Magazine, 386-25 Product Review

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Shown in optional mini-tower case

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Lease for $134/month*

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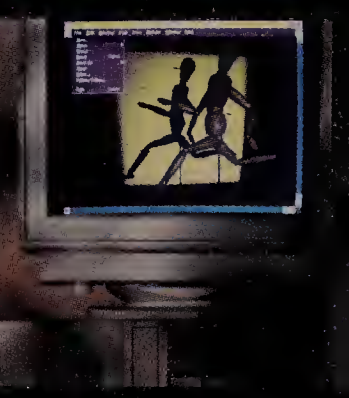

486/33 EISA CACHE SYSTEM

• 33MHz 80486DX CPU operating at zero wait states • Built-in 8K 4-way set associative cache • 256K Hi-Performance direct-mapped secondary cache • 4MB RAM • 200MB 16ms Hard Disk w/cache • 14″ Super VGA non-interlaced color monitor with 1024 x 768 resolution • 16 bit high performance Super VGA card with 1MB RAM, 256 colors • 1.2MB and 1.44MB floppy drives • 1 parallel and 2 serial ports • Desktop case with 200 watt power supply • 101 key click/tactile keyboard • DOS 5.0 • Windows 3.0 • Microsoft compatible mouse.

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INTRODUCTORY OFFER EXPIRES OCT. 31, 1991

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386/40 CACHE SYSTEM

• 40MHz 80386DX CPU operating at zero wait states • 128K write-back cache • 4MB RAM • 100MB hard drive • 14″ super VGA non-interlaced color monitor with 1024 x 768 resolution • 16 bit high performance super VGA card with 1MB video RAM • 1.2MB and 1.44MB floppy drives • 1 parallel and 2 serial ports • 101 key click/tactile keyboard • DOS 5.0 • Windows 3.0 • Microsoft compatible mouse • 200 watt power supply • Desktop or Slimline case. Same system as above with Orchid Pro Designer IIs featuring 32,768 true colors and 17″ flat screen super VGA color monitor . . . add $809.

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FEATURES EVALUATION

Tools of the Accounting Trade

Features are tools for getting a job done. When the job is balancing your business's books, the most important tools are those that help you handle revenues and expenditures.

● Yes
○ No
◒ Deficient
▼ Limited only by available disk space

Standard features	Accpac Simply Accounting 1.0A W	Crystal Accounting 4.0 W	M.Y.O.B. 2.0 W	Sybiz Windows Accounting 1.4 W
List price	$199	$249	$249	$495
RAM required	1MB	640K[1]	1MB	640K
Other modules included				
Inventory	●	○	●	●
Payroll	●	●	○	○
Job cost	●	○	●	○
Local area network support	●	●	○	○
Setting up books				
Start-up charts of account	7	1	5	1
Maximum fiscal periods per year	365	13	13	12
Optional cash-basis accounting	○	●	○	○
Tracking revenues				
Maximum number of customers	32,000	▼	32,767	19,200
Customizable invoice format	○	○	●	●
Customizable statement format	○	○	●	●
Customer-specific payment terms	○	●	●	●
Automatically computes finance charges	●	●	●	●
Age-dependent dunning notices	○	●	◒[2]	◒[2]
Recurring invoices	○	●	○	●
Overseeing books				
Displays entire transaction during data entry	●	●	●	○
Maximum number of open fiscal periods	365	13	13	2
Tracks multiple departments	○	●	○	○
Maintains budget data	○	●	●	●

Managing expenditures	Accpac Simply Accounting 1.0A W	Crystal Accounting 4.0 W	M.Y.O.B. 2.0 W	Sybiz Windows Accounting 1.4 W
Maximum number of vendors	32,000	▼	32,767	19,200
Customizable check and payment advice formats	○	○	●	○
Vendor-specific payment terms	○	●	●	●
Recurring payments	○	●	●	○
Automatically computes discount for prompt payment	○	●	●	●
Cash requirements report	●	●	●	●[3]
Reporting finances				
Customizable financial statements	○	●	○	○
Graphical display of financial position	○	○	●	●
Statement of changes in financial position	○	●	○	○
Reconciles checks to bank account	○	○	●	○
Sales analysis by product and territory	○	○	●	●
Module-level password protection	●	●	○	○
Service and support				
Unlimited free support	◒[4]	○	◒[5]	●
Toll-free support line	○	●	○	○
Daily support hours	10	9	10	8.5
Weekend support	○	○	○	○
CompuServe SIG	○	○	○	●
BBS support	○	○	○	○
Fax support	●	●	●	●
Other extra-cost training or support	●	●	●	○

W Windows product.
[1] 1MB recommended.
[2] Can't select customers based on overdue accounts.
[3] Predicts income as well as expenditures.
[4] Two free calls allowed.
[5] One month free.

WHERE TO BUY

Accpac Simply Accounting for Windows 1.0A
Computer Associates Int'l, Inc.
711 Stewart Ave.
Garden City, NY 11530
800/645-3003
LIST PRICE: $199
Reader service no. 665

Crystal Accounting 4.0
Peachtree Software
1505 Pavilion Pl.
Norcross, GA 30093
800/247-3224
LIST PRICE: $249
Reader service no. 666

M.Y.O.B. 2.0
Teleware
300 Roundhill Dr.
Rockaway, NJ 07866
800/322-6962,
201/586-8885 (fax)
LIST PRICE: $249
Reader service no. 667

Sybiz Windows Accounting 1.4
Brown-Wagh Publishing
130-D Knowles Dr.
Los Gatos, CA 95030
800/451-0900,
408/378-3838,
408/378-3577 (fax)
LIST PRICE: $495
Reader service no. 668

220 OF THE WORLD'S HOTTEST PRODUCTS

The Readers' Choice

1991

Brush off that tux, break out the Dom Perignon, and join

World

us for the 1991 World Class Awards, where we select

Class

the world's top hardware and software products.

AWARDS

WELCOME to the ninth annual World Class Awards—the PC industry's equivalent of the Oscars. The limos are stretched around the block, and all the big stars—*WordPerfect, Windows,* and the Hewlett-Packard LaserJet, among others—are here to accept the awards that you, our readers, have so generously bestowed.

Last March we asked you to tell us which products had box-office clout and which were headed straight to the rental rack. Thousands of responses tumbled in, naming the best hardware, software, and services in 49 categories. As always, we pulled three of the ballots at random and divvied up $50,000 worth of winning products among

Christine Whyte

RON CHAN

the lucky voters (see the sidebar "Ayes on the Prize").

World Class may be a tradition, but you'll find no cobwebs on these statuettes. We've kept pace with the industry, adding a slew of new categories that reflect the changing ways people use PCs. For users on the go, small is beautiful, which is why we've added an award for best notebook computer. These lightweight wonders have evolved from sluggish 8086 systems with crude CGA graphics to 386 powerhouses featuring VGA displays and as much as 4MB of RAM—all the while remaining small enough to slip into your attaché case.

Dramatic improvements in speed, price, and functionality make fax boards and tape backup systems indispensible parts of a complete PC repertoire, which is why we've included them in this year's World Class cast. And in a nod to the silent era, we've added an award for ink jet printers, whisper-quiet devices that produce laserlike output at dot matrix prices.

New software categories range from backup programs and forms software to those stars of page and screen, font packages. Also new this year is shareware, always a low-budget crowd-pleaser, and LAN E-mail—instant communication when a car phone isn't enough.

The auditorium is standing room only, and all the big studio heads are here—Bill, Jim, Philippe. But who are those people in blue suits? For the first time in World Class history, IBM didn't win a single award. Sorry, babe. Call us next year and maybe we'll do lunch.

Our list of winners ranges from the familiar cast of superstars to talented understudies that stole the spotlight from such legends as *1-2-3*, *dBASE*, and MS-DOS (see the sidebar "Rising Stars"). The complete list of lead and supporting players appears on the following pages, but a few stellar performers deserve a special spotlight.

▶ A Hardware's Night

For most previous hardware winners, the 1991 World Class Awards are a sequel to last year's, though the plot twists along the way make it an interesting story.

Compaq flexed its Schwartzeneggeresque pecs again, winning the desktop PC award for the fifth year in a row. This time the winning model was its 33-MHz Deskpro 486/33L (Best Buy, March 1991), proving that users continue to be pumped up about performance.

But Compaq proved slightly less successful in its lighter roles. Toshiba's T5200C won the award for its moving portrayal of a transportable computer, packing a 20-MHz 386, 200MB hard disk, and color display into its sturdy 19-pound frame. And readers picked Texas Instruments' TravelMate 2000 as the notebook they loved to lift. The 286-based TravelMate (Best Buy, October 1990) offers an add-on battery with enough juice to keep you computing from coast to coast—all in a svelte 7½-pound package.

With peripherals, readers stuck to familiar matinee idols. NEC, Hayes, and Microsoft maintained their mastery of monitors, modems, and mice. HP continued its reign as ruling prints, quietly dominating the ink jet and laser printer categories with its DeskJet 500 and scalable-font LaserJet III.

But not everything went according to script. Plus Development's hard disk on a card, the Hardcard II XL, squeaked by Seagate's trusty ST251-1 40MB hard disk as the storage device of the masses. And Artisoft's Lantastic AE-2 board rose above its peers, ousting four-time champ IBM Token-Ring as LAN board of choice.

In the new categories of tape backup and fax boards, our readers had no trouble casting winners. For fast hard disk backups they chose the Jumbo 120, Colorado Memory Systems' ground-breaking tape drive that uses data compression to combine low cost with high storage capacity. Our fax board winner, Intel's SatisFaxtion, provides everything you need for thoroughly modern communication. You can send and receive documents from your PC, transmit faxes in the background or schedule them for later, and use its built-in 2400-baud modem to transfer files.

For best hardware vendor in a supporting role, the statuette went to Dell Computer. And for most promising newcomer, users gave a big hand to Go's PenPoint, the revolutionary pen-based operating system that lets you enter data into hand-held PCs without fingering a keyboard.

▶ But Soft...

This year's software voting reflects the shift toward graphical programs inspired by the dramatic debut of *Windows 3.0*. Everyone's favorite ingenue left the dais clutching awards for best operating system/environment and most promising newcomer, and helped carry several programs to victory.

Aldus's *PageMaker* topped the desktop publishing category for the second year in a row, increasing its lead over *Ventura Publisher* with built-in text and table editors and support for full-color images. In the new font package category, *Adobe Type Manager* proved just our readers' type for smooth screen and printer output. And *Corel Draw* (Best Buy, May 1991, July 1989) sent last year's Paint/Draw winner, ZSoft's *PC Paintbrush*, sprawling to the canvas as users sought more sophisticated type and graphics.

Windows cast a long shadow in word processing, where *WordPerfect* (Best Buy, July 1989) won for the fifth straight year. *Word for Windows* and *Ami Pro* accounted for almost 20 percent of the vote between them—up from last year's 5 percent—indicating that more and more users are going graphical when they do the write thing.

Users are also increasingly aware of the advantages of networked communications, choosing Novell NetWare 3.11 (Best Buy, March 1991) as the LAN for all seasons. NetWare taps the memory management and multitasking capabilities of 386 and 486 servers to meet the demands of burgeoning LANs and client-server applications. And when networked users wanted to reach out and touch someone, they elected

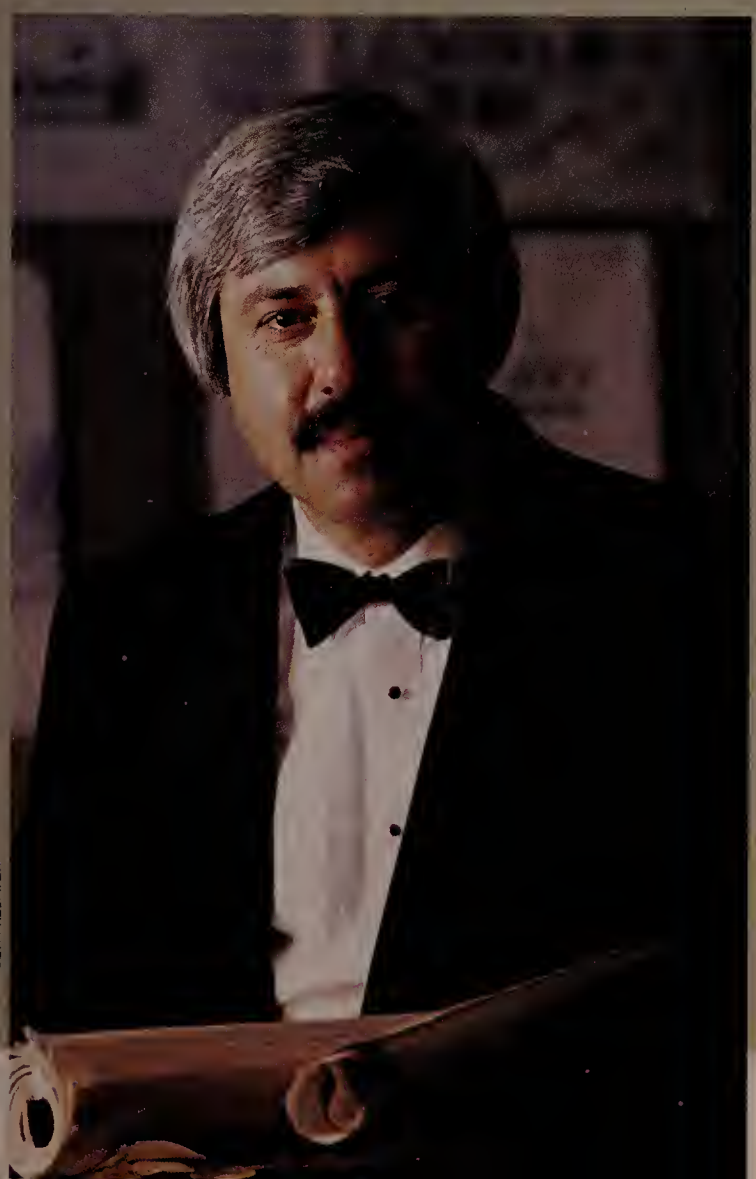
Ayes on the Prize

When you send in your World Class ballot, you're not only voting for the top hardware and software products, you're also vying for thousands of dollars in prizes. This year, as always, we closed our eyes, reached deep into the heap of ballots, and pulled out the names of three lucky World Class winners. Our third-prize winner is now the proud owner of the award-winning notebook computer. This miniature marvel weighs less than 10 pounds and fits comfortably inside a briefcase. The second-prize winner walks away with our World Class voters' favorite portable computer, a new category that includes larger laptops as well as easily transportable AC-powered computers. Our first-prize recipient takes home the pot o' gold: the top-rated desktop computer, and the winning products in 40 categories—a grand prize totaling more than $35,000.

Anthony P. D'Onofrio

First Prize: Compaq Deskpro 486/33L plus the winning hardware and software products

An architect and owner of a design services firm in North Scituate, Massachusetts, 52-year-old Anthony D'Onofrio was "absolutely flabbergasted" when told he had won the World Class first prize. He currently uses a Micro Smart 386/25 and an Acer 286/10, but was contemplating an upgrade of the 286 machine as soon as the economy improved. Now he won't have to wait, and he'll have a truckload of peripherals, as well. "Getting the laser printer, scanner, fax board, and tape backup is fantastic. They'll save me time, increase my productivity, and generally make my life easier."



SETH RESNICK

ART STEIN

John Tomaselli

Second Prize: Toshiba America T5200C

Paperwork is an inevitable part of police work, as 36-year-old patrol lieutenant John Tomaselli will attest. Now that he's won a portable computer, John will no longer have to do his reports at home on his CompuAdd 286. "We don't have PC compatibles where I work [county police headquarters in Fairfax, Virginia], but now I can take my new portable in the patrol car or to the station to get some of my paperwork done." An avid home PC user, John signs on to the Prodigy on line service at least once a day.

Don Schmidt

Third Prize: TI TravelMate 2000

DAVID SAMSON

Don Schmidt puts PCs to work for a good cause. His employer, a federally funded nonprofit agency in Fargo, North Dakota, installs energy-conserving materials in the homes of low-income people. As computer operations and inventory control manager, 42-year-old Don uses an Everex 386 SX with *dBASE III Plus, SuperCalc,* and custom software for job costing and budgeting. Notebook computers are "a nifty idea," Don says, though he hasn't decided how he'll use his. "I might make it my home computer, or use it to track appointments and maintain a contacts data base when I travel."

Lotus's *cc:Mail* (Best Buy, September 1991) as the E-mail program that lets their fingers do the talking.

When software is involved, money is always an object. In the new categories of shareware, backup programs, and forms packages, our readers chose three winners that get the job done without costing a fistful of dollars. PKware's PKZip package won the shareware shoot-out for its ability to corral big files into tiny spaces. *Central Point Backup* was the peoples' choice for painless floppy backup, thanks to its simple menu-driven operation and solid data integrity features. And when you need to create electronic invoices and other vital business documents, readers recommend BLOC's *FormTool* to keep funny things from happening on the way to the form.

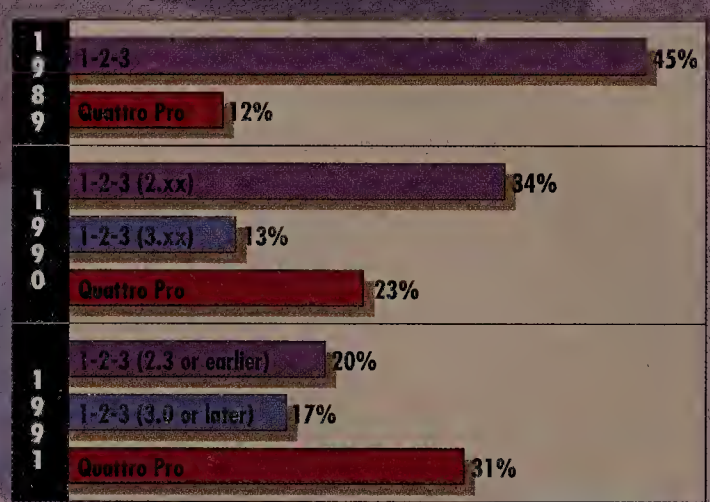
Finally, when you're stuck and the Help key is no help, who

Rising Stars

Our readers sure know how to spot talent when they see it. This year they took a handful of products—virtual unknowns just a few short years ago—and vaulted them straight to stardom. We asked some of our readers why they awarded Borland's *Quattro Pro* and *Paradox* and Microsoft's *Windows* top billing over such traditional box-office stars as *1-2-3*, *dBASE*, and DOS. Their answers appear here, along with graphs illustrating how, after years of gradually gaining momentum, these three programs became overnight successes.

QUATTRO PRO'S EXCELLENT ADVENTURE

Percentage of World Class votes for spreadsheet programs



Quattro Pro's slow but steady rise is the classic rags-to-riches success story. Our readers felt Borland's graphical spreadsheet offered better value and ease of use than either flavor of 1-2-3.

The Judges Speak

Quattro Pro is extremely easy to use: The flexible menu system lets you simulate other programs, such as *1-2-3*, and you can customize its templates.

Katheryn Ridgley, management consultant
New York

Quattro Pro's windowing environment lets you work with more than one spreadsheet. You can open multiple spreadsheets, link them together, and copy cells from one spreadsheet to another.

Richard Huntsinger, kosher foods specialist
Dayton, New Jersey

Quattro Pro's graphics are superior to *1-2-3*'s, not only because the graphs are easy to create, but also because the program offers a range of typefaces and a selection of visually appealing graphs.

Jules Flangere III, executive vice president
Neptune, New Jersey

Quattro Pro works like a miniature DOS file manager—I can compress spreadsheets and delete out-of-date ones.

Mark Yatrofsky, systems analyst
Norfolk, Virginia

The Judges Speak

I program with PAL [Paradox Applications Language] because it's intuitive and powerful; I haven't come up with anything it can't do. *dBASE* and *FoxPro* take a lot longer to figure out.

Noverto Atencio, computer services company owner
Albuquerque, New Mexico

Paradox lets you relate different data bases. And it's easy to select what you want in a report—simply click on the appropriate columns.

Donald Keirstead, sales engineer
North Andover, Massachusetts

Editing tables is easy because you can bring up two tables on screen and jump back and forth between them.

Donna Kainer, senior consultant
Houston, Texas

We used *R:base* before, but *Paradox*'s graphical interface is nice and easy in comparison; a first-time user can grasp it right away.

Marie Reese, support services department manager
Charlotte, North Carolina

you gonna call? For the second year in a row, *WordPerfect* busted its competition in service and support, ghosting to an easy victory.

▶ Fade Out

Like Hollywood, World Class holds up a mirror to the industry, showing us where we are and where we're headed. And it keeps getting better. Remember to join us again next year for our tenth annual awards. It's bound to be a blockbuster.

Christine Whyte, formerly an editor with Publish *magazine, is now a freelance editor in San Francisco. World Class ballots were tabulated by the Wilson Research Group in San Carlos, California.*

The Judges Speak

Windows is great for novices who freak at a DOS prompt. For power users, DDE [Dynamic Data Exchange] is the benefit. You can take Excel data and charts into a word processing program, and update them automatically without having to go back into the original program.

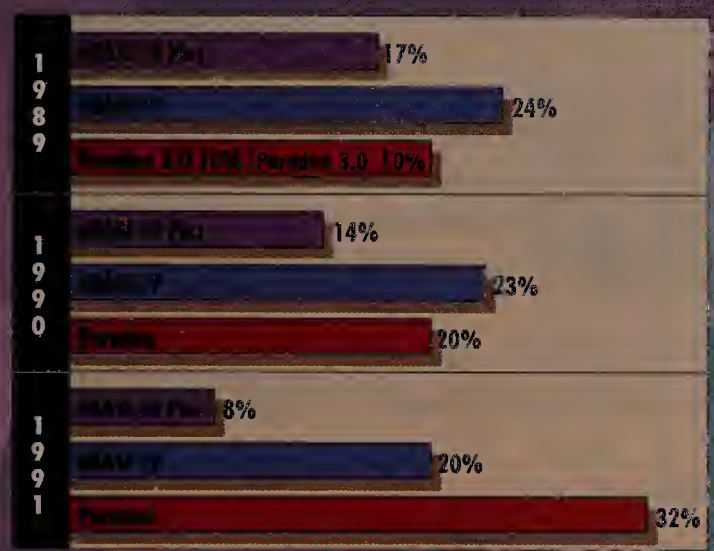
Lin Varnum, PC consultant/VAR
Fort Bragg, California

With Windows it's easy to switch between all the programs we use in our design group: *Publisher's Paintbrush, PageMaker,* and *Corel Draw*. Most of my staff are artists, and Windows lets them do what artists do best: create.

Mrs. "Frankie" Williams, client relations director
Long Beach, California

THE DATA MANAGER WHO WOULD BE KING

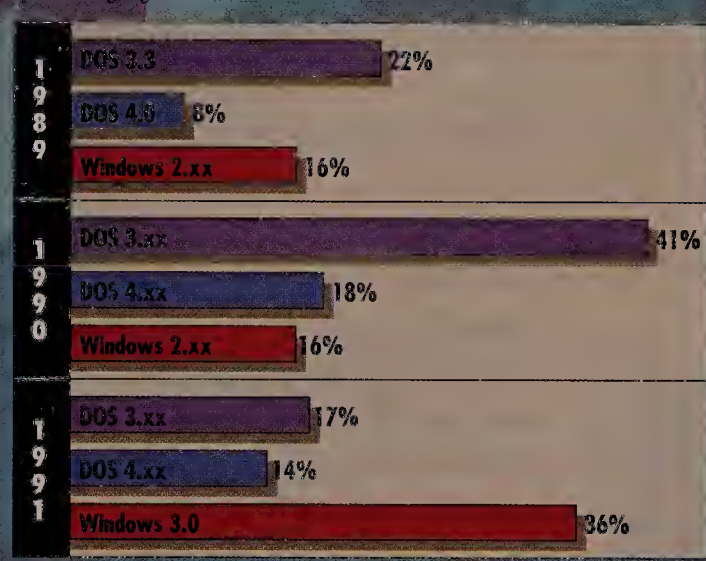
Percentage of World Class votes for relational data base programs



The king of data bases is dead. Long live the king. Our readers sniffed out Paradox's imminent accession to the dBASE throne long before Borland's planned acquisition of Ashton-Tate. The reasons they gave are simple: Paradox is refreshingly accessible and less intimidating.

DIAL M FOR MICROSOFT

Percentage of World Class votes for operating systems/environments



In a sibling rivalry matching that of the Gabor sisters, Microsoft's DOS and Windows environments have battled through the years, with DOS usually coming out on top. But Windows 3.0 changed all that—winning double billing this year as best operating system/environment and most promising newcomer in software—thanks to its friendlier interface and ability to juggle multiple applications.

Windows lets me customize my screen: I can add backgrounds, build new colors, create icons, and adjust border widths. I can also take advantage of extended memory.

Eileen Kenneda, computer consultant
Dallas, Texas

I provide technical support, so I appreciate the consistency between Windows programs—it makes them easier to teach.

Mark Henderson, staff consultant
Rochester, Minnesota

Windows 3.0 gives you multitasking so you can run several programs at the same time or print in the background.

Hoa Nguyen, engineering manager
Hudson, New York

HARDWARE

220 OF THE WORLD'S HOTTEST PRODUCTS

Best Buy winner within past two years.
World Class Award winner 1990.
* Non-awarded category.
Percentages rounded to nearest whole number; winners are determined by raw vote totals.

DESKTOP COMPUTER

Product, Manufacturer	% of Votes
Deskpro 486/33L, Compaq Computer	10
386/33MHz, Gateway 2000	5
System 333D, Dell Computer	3
386/25MHz, Gateway 2000	3
Deskpro 386/33, Compaq Computer	3
Others	76

74 percent of the respondents voted in this category

PORTABLE COMPUTER

Product, Manufacturer	% of Votes
Toshiba T5200C, Toshiba America	25
Toshiba T5200, Toshiba America	12
Toshiba T3200SX, Toshiba America	5
Dell System 320LT, Dell Computer	3
Toshiba T3100SX, Toshiba America	3
Others	52

47 percent of the respondents voted in this category

NOTEBOOK COMPUTER

Product, Manufacturer	% of Votes
TI TravelMate 2000, Texas Instruments	15
Compaq LTE/386, Compaq Computer	13
Zeos Notebook 386, Zeos Int'l	7
TI TravelMate 3000, Texas Instruments	6
Zeos Notebook 286, Zeos Int'l	4
Others	59

38 percent of the respondents voted in this category

LASER PRINTER

Product, Manufacturer	% of Votes
HP LaserJet III, Hewlett-Packard	43
HP LaserJet IIID, Hewlett-Packard	11
HP LaserJet IIP, Hewlett-Packard	10
HP LaserJet Series II, Hewlett-Packard	9
Epson EPL-7500, Epson America	2
Others	25

68 percent of the respondents voted in this category

DOT MATRIX PRINTER

Product, Manufacturer	% of Votes
Panasonic KX-P1124i, Panasonic	21
Panasonic KX-P1624, Panasonic	6
Epson LQ-1050, Epson America	6
Epson LQ-2550, Epson America	5
Citizen GSX-140, Citizen America	4
Others	58

62 percent of the respondents voted in this category

INK JET PRINTER

Product, Manufacturer	% of Votes
HP DeskJet 500, Hewlett-Packard	35
HP DeskJet Plus, Hewlett-Packard	17
Canon BJ-10e, Canon America	9
HP PaintJet, Hewlett-Packard	6
Kodak Diconix Color 4, Eastman Kodak	5
Others	28

35 percent of the respondents voted in this category

MONITOR

Product, Manufacturer	% of Votes
NEC MultiSync 3D, NEC Technologies	21
NEC MultiSync 4D, NEC Technologies	13
NEC MultiSync 5D, NEC Technologies	11
NEC MultiSync 2A, NEC Technologies	8
Sony MultiScan CPD-1304, Sony Corp.	5
Others	42

57 percent of the respondents voted in this category

MODEM

Product, Manufacturer	% of Votes
Smartmodem 2400, Hayes Microcomputer Products	17
Intel 9600EX, Intel	6
Ultra 96, Hayes Microcomputer Products	6
Smartmodem 9600, Hayes Microcomputer Products	4
V-series Smartmodem 9600, Hayes Microcomputer Products	4
Others	63

43 percent of the respondents voted in this category

FAX BOARD

Product, Manufacturer	% of Votes
SatisFaxtion, Intel	33
Fax96, Fremont Communications	15
JT Fax 9600, Hayes Microcomputer Products	10
The Complete Communicator, The Complete PC	6
FaxPro II, The Fax Group	4
Others	32

19 percent of the respondents voted in this category

MEMORY EXPANSION BOARD

Product, Manufacturer	% of Votes
AboveBoard Plus 8, Intel	26
BocoRAM/AT Plus, Boco Research	14
AboveBoard Plus, Intel ▲	11
Rampage Plus, AST Computers	7
SixPakPlus, AST Computers	5
Others	37

16 percent of the respondents voted in this category

GRAPHICS BOARD

Product, Manufacturer	% of Votes
VGA Wonder VIP 512, ATI Technologies ▲	23
MultiSync Graphics Engine Board, NEC Technologies	10
ProDesigner IIs, Orchid Technology	9
Paradise VGA 1024, Western Digital	7
Paradise VGA Plus 16, Western Digital	4
Others	47

28 percent of the respondents voted in this category

MASS STORAGE

Product, Manufacturer	% of Votes
Hardcard II XL, Plus Development	7
Seagate ST251-1, Seagate Technology ▲	7
NEC CDR-83, NEC Technologies	3
Conner CP-3100, Conner Peripherals	3
Conner Cougar 210MB, Conner Peripherals	3
Others	73

22 percent of the respondents voted in this category

TAPE BACKUP DRIVE

Product, Manufacturer	% of Votes
Jumbo 120, Colorado Memory Systems	22
Excel 60F, Everex Systems	5
Irwin Tape Backup System, Irwin Magnetics	4
MoynStream 60MB Cassette, Maynard Electronics	4
Mountain FileSafe 8000Plus, Mountain Network Solutions	3
Others	62

28 percent of the respondents voted in this category

SCANNER

Product, Manufacturer	% of Votes
HP ScanJet Plus, Hewlett-Packard ▲	31
ScanMan 256, Logitech	28
M800, Marstek	5
ES-300C, Epson America	3
Complete Page Scanner, The Complete PC	3
Others	30

28 percent of the respondents voted in this category

POINTING DEVICE

Product, Manufacturer	% of Votes
Microsoft Mouse, Microsoft ▲	46
MouseMan, Logitech	28
TrackMan, Logitech	8
PC-TRAC, MicroSpeed	1
Genius Mouse, KYE Int'l	1
Others	16

48 percent of the respondents voted in this category

LAN BOARD*

Product, Manufacturer	% of Votes
Lantastic AE-2, Artisoft	14
NE 2000, Novell/Eagle Technologies	12
EtherLink Network Adaptor, 3Com	11
Token-Ring, IBM ▲	9
EtherCard PLUS Series, Western Digital	9
Others	45

12 percent of the respondents voted in this category

MOST PROMISING NEWCOMER

Product, Manufacturer	% of Votes
PenPaint, Go	12
Edsun CEG/DAC, Edsun	5
The Brick, Ergo Computing	3
LaserJet III, Hewlett-Packard	2
NEC CDR-83, NEC Technologies	2
Others	76

19 percent of the respondents voted in this category

SERVICE AND SUPPORT — HARDWARE*

Company	% of Votes
Dell Computer	16
Gateway 2000	14
Northgate Computer	8
IBM ▲	8
Hewlett-Packard	7
Others	47

31 percent of the respondents voted in this category

SERVICE AND SUPPORT— SOFTWARE*

Company	% of Votes
WordPerfect ▲	39
Microsoft	15
Borland Int'l	9
Lotus Development	3
Central Point Software	3
Others	31

36 percent of the respondents voted in this category

MAIL-ORDER COMPANY*

Company	% of Votes
PC Connection ▲	29
CompuAdd	9
Telemart	7
Gateway 2000	6
Dell Computer	5
Others	44

38 percent of the respondents voted in this category

SOFTWARE

220 OF THE WORLD'S HOTTEST PRODUCTS

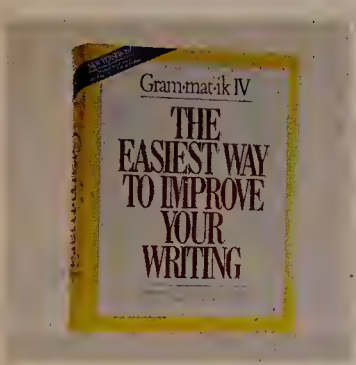
World Class Award winner 1990.
* Non-awarded category.
Percentages rounded to nearest whole number; winners are determined by raw vote totals.

WORD PROCESSING

Product, Manufacturer	% of Votes
WordPerfect, WordPerfect	55
Microsoft Word for Windows, Microsoft	14
Microsoft Word, Microsoft	8
WordStar, WordStar Int'l	5
Ami Pro, Lotus Development	5
Others	13

87 percent of the respondents voted in this category

WORD PROCESSING UTILITY



Product, Manufacturer	% of Votes
Grammatik, Reference Software	26
RightWriter, Que Software	17
Grammatik Windows IV, Reference Software	9
Word for Word Professional, Mastersoft	3
WordPerfect Executive, WordPerfect	3
Others	42

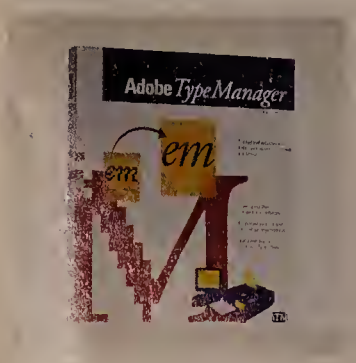
18 percent of the respondents voted in this category

DESKTOP PUBLISHING

Product, Manufacturer	% of Votes
PageMaker, Aldus	46
Ventura Publisher DOS/GEM, Ventura Software	20
First Publisher, Software Publishing	8
Publish-It, Timeworks Software	5
Express Publisher, Power Up Software	3
Others	18

42 percent of the respondents voted in this category

FONT PACKAGE



Product, Manufacturer	% of Votes
Adobe Type Manager, Adobe Systems	31
Fontware, Bitstream	14
FaceLift for Windows, Bitstream	9
25-in-One! III, Pacific Data Products	5
PostScript Fonts, Adobe Systems	5
Others	36

24 percent of the respondents voted in this category

DRAW/PAINT

Product, Manufacturer	% of Votes
Corel Draw, Corel Systems	50
PC Paintbrush, ZSoft	17
Microsoft Paintbrush, Microsoft	6
DrawPerfect, WordPerfect	5
Micrografx Designer, Micrografx	3
Others	20

SPREADSHEET

Product, Manufacturer	% of Votes
Quattro Pro, Borland Int'l	31
Excel, Microsoft	25
1-2-3 2.xx, Lotus Development	20
1-2-3 3.xx, Lotus Development	17
SuperCalc5.0c, Computer Associates Int'l	1
Others	6

74 percent of the respondents voted in this category

SPREADSHEET UTILITY

Product, Manufacturer	% of Votes
Allways, Lotus Development	30
Sideways, Funk Software	23
PC Publishing Impress, PC Publishing	8
1-2-3 2.xx, Lotus Development	3
Q+E, Pioneer Software	3
Others	33

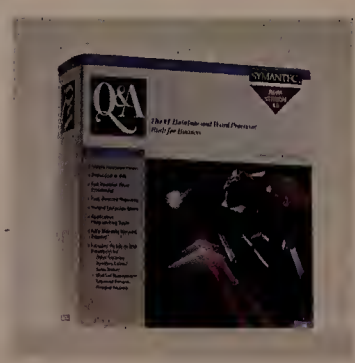
14 percent of the respondents voted in this category

RELATIONAL DATA BASE

Product, Manufacturer	% of Votes
Paradox, Borland Int'l	32
dBASE IV, Ashton-Tate	20
dBASE III Plus, Ashton-Tate	8
Alpha Four, Alpha Software	7
FoxPro, Fox Software	6
Others	27

46 percent of the respondents voted in this category

FLAT-FILE DATA BASE



Product, Manufacturer	% of Votes
Q&A, Symantec	30
PC-File, ButtonWare	14
Reflex, Borland Int'l	12
ProFessional File, Software Publishing	5
dBASE IV, Ashton-Tate	4
Others	35

21 percent of the respondents voted in this category

FORMS SOFTWARE

Product, Manufacturer	% of Votes
FormTool, BLOC Publishing	34
PerForm Pro, Delrina Technologies	15
FormWorx with Fill & File, FormWorx	14
PerForm, Delrina Technologies	12
FormFiller, BLOC Publishing	5
Others	23

21 percent of the respondents voted in this category

SHAREWARE

Product, Manufacturer	% of Votes
PKZip PKUnzip PKSFX, PKware	19
Procomm Plus, Datastorm Technologies	6
List Plus, Buerg Software	6
PC-Write, Quicksoft	4
AutoMenu, Magee Enterprises	4
Others	61

30 percent of the respondents voted in this category

COMMUNICATIONS

Product, Manufacturer	% of Votes
Procomm Plus, Datastorm Technologies	60
Telix, Exis	5
Crosstalk for Windows, DCA	4
QModem, Forbin Project	3
Crosstalk Mk.4, DCA	3
Others	25

45 percent of the respondents voted in this category

UTILITY

Product, Manufacturer	% of Votes
PC Tools, Central Point Software	41
The Norton Utilities, Symantec	30
XtreePro Gold, Executive Systems	7
The Norton Commander, Symantec	2
Magellan, Lotus Development	1
Others	19

LAN E-MAIL

Product, Manufacturer	% of Votes
cc:Mail, Lotus Development	25
Da Vinci eMail, Da Vinci Systems	17
WordPerfect Office, WordPerfect	14
Microsoft Mail/Network Courier, Microsoft	4
Higgins, Enable Software	2
Others	38

6 percent of the respondents voted in this category

BACKUP PROGRAM

Product, Manufacturer	% of Votes
Central Point Backup, Central Point Software	44
Fastback Plus, Fifth Generation Systems	32
Norton Backup, Symantec	13
Back-It, Gazelle Systems	1
PC Fullbak +, Westlake Data	1
Others	11

45 percent of the respondents voted in this category

LAN OPERATING SYSTEM

Product, Manufacturer	% of Votes
NetWare 3.11, Novell	35
NetWare 2.2, Novell	34
LANtastic 4.0, Artisoft	11
VINES, Banyan Systems	4
Microsoft LAN Manager, Microsoft	3
Others	13

20 percent of the respondents voted in this category

PERSONAL INFORMATION MANAGER

Product, Manufacturer	% of Votes
Agenda, Lotus Development	15
PC Tools, Central Point Software	11
Sidekick Plus, Borland Int'l	11
Current, IBM Desktop Software	9
Info Select, Micro Logic	8
Others	46

18 percent of the respondents voted in this category

ON-LINE SERVICE/BBS

Product, Manufacturer	% of Votes
CompuServe, CompuServe Information Service	45
Prodigy, IBM	25
GEnie, General Electric	11
Delphi, Delphi	2
Exec-PC/MKE, Exec-PC/Mahoney	1
Others	16

29 percent of the respondents voted in this category

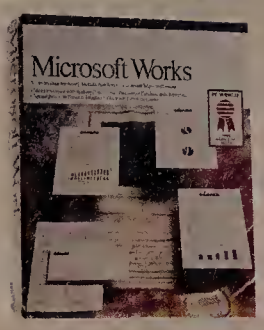
PROGRAMMING LANGUAGE

Product, Manufacturer	% of Votes
Turbo C++, Borland Int'l	23
Turbo Pascal, Borland Int'l	17
Microsoft QuickBasic Interpreter, Microsoft	14
Microsoft Quick C, Microsoft	10
Microsoft Basic, Microsoft	6
Others	30

33 percent of the respondents voted in this category

SOFTWARE

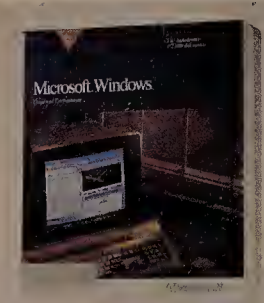
INTEGRATED



Product, Manufacturer	% of Votes
Microsoft Works, Microsoft	40
First Choice, Spinnaker Software	12
Symphony, Lotus Development	8
GeoWorks Ensemble, GeoWorks	5
Framework IV, Ashton-Tate	5
Others	30

21 percent of the respondents voted in this category

OPERATING SYSTEM/ENVIRONMENT



Product, Manufacturer	% of Votes
Windows 3.0, Microsoft	36
MS-DOS/PC-DOS 3.xx, Microsoft/IBM	17
MS-DOS/PC-DOS 4.xx, Microsoft/IBM	14
Desqview 386, Quarterdeck Office Systems	5
DR DOS, Digital Research	4
Others	24

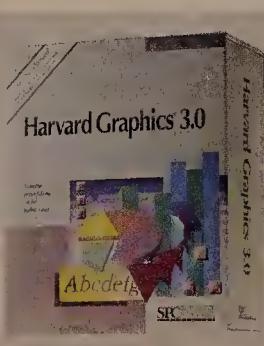
56 percent of the respondents voted in this category

GAME

Product, Manufacturer	% of Votes
Flight Simulator, Microsoft	9
SimCity, Maxis	8
Tetris, Spectrum Holobyte	7
King's Quest IV, Sierra On-line	6
Wing Commander, Origin	4
Others	66

39 percent of the respondents voted in this category

PRESENTATION GRAPHICS



Product, Manufacturer	% of Votes
Harvard Graphics, Software Publishing	52
Freelance Plus, Lotus Development	11
Microsoft PowerPoint for Windows, Microsoft	10
Corel Draw, Corel Systems	4
DrawPerfect, WordPerfect	3
Others	21

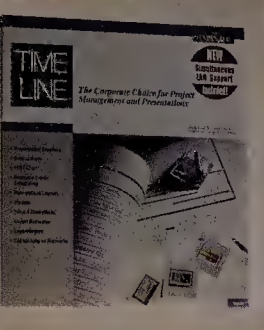
30 percent of the respondents voted in this category

COMPUTER-AIDED DESIGN

Product, Manufacturer	% of Votes
AutoCAD, Autodesk	47
Generic CADD, Generic Software	15
DesignCAD, American Small Business	13
AutoSketch, Generic Software	6
EasyCAD, Evolution Computing	3
Others	16

20 percent of the respondents voted in this category

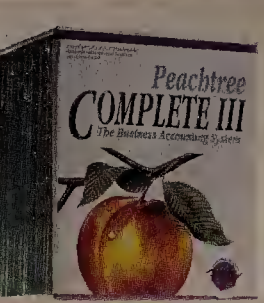
PROJECT MANAGER



Product, Manufacturer	% of Votes
Time Line, Symantec	23
Microsoft Project for Windows, Microsoft	19
Microsoft Project, Microsoft	17
Harvard Project Manager, Software Publishing	10
SuperProject, Computer Associates Int'l	6
Others	25

15 percent of the respondents voted in this category

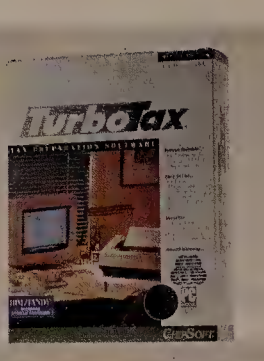
ACCOUNTING



Product, Manufacturer	% of Votes
Peachtree Complete III, Peachtree Software	18
DacEasy Accounting, DacEasy	17
Pacioli 2000, M-USA Business Systems	14
Quicken, Intuit	13
Money Counts, Parsons Technology	4
Others	34

23 percent of the respondents voted in this category

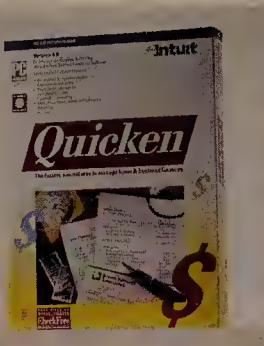
TAX PLANNING OR PREPARATION



Product, Manufacturer	% of Votes
TurboTax, ChipSoft	57
Tax Cut, MECA Software	16
Andrew Tobias' Personal Tax Edge, Parsons Technology	11
Taxview Professional Edition, Softview	2
AM Tax, AM Software	2
Others	12

29 percent of the respondents voted in this category

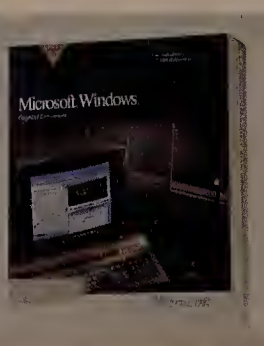
PERSONAL FINANCE



Product, Manufacturer	% of Votes
Quicken, Intuit	54
Managing Your Money, MECA Software	24
Money Counts, Parsons Technology	12
WealthBuilder, Reality Technologies	1
DacEasy Light Checkbook Accounting, DacEasy	1
Others	8

34 percent of the respondents voted in this category

MOST PROMISING NEWCOMER



Product, Manufacturer	% of Votes
Windows 3.0, Microsoft	18
GeoWorks Ensemble, Ensemble	14
Excel 3.0, Microsoft	5
PenPoint, Go	4
DR DOS 5.0, Digital Research	2
Others	57

23 percent of the respondents voted in this category

WHERE TO BUY

AboveBoard Plus 8
Intel Corp.
5200 N.E. Elam Young Pkwy.
Mailstop C03-07
Hillsboro, OR
97124-6497
800/538-3373
Reader service no. 618

Adobe Type Manager
Adobe Systems
1585 Charleston Rd.
P.O. Box 7900
Mountain View, CA
94039-7900
800/833-6687,
415/961-3769 (fax)
Reader service no. 619

Agenda
Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA
02142
800/343-5414
Reader service no. 620

Allways
Lotus Development Corp.
Reader service no. 621

AutoCAD
Autodesk, Inc.
2320 Marinship Way
Sausalito, CA 94965
800/445-5415,
415/331-8093 (fax)
Reader service no. 622

cc:Mail
Lotus Development Corp.
Reader service no. 623

Central Point Backup
Central Point Software
15220 N.W. Greenbrier Pkwy.
#200
Beaverton, OR 97006
800/888-8199,
503/690-8083 (fax)
Reader service no. 624

CompuServe
CompuServe Information Service
5000 Arlington Centre Blvd.
P.O. Box 20212
Columbus, OH 43220
800/848-8199,
614/457-0348
Reader service no. 625

Corel Draw
Corel Systems
Corel Bldg.
1600 Carling Ave.
Ottawa, Ontario
K1Z 8R7 Canada
613/728-8200,
613/728-9790 (fax)
Reader service no. 626

Deskpro 486/33L
Compaq Computer Corp.
P.O. Box 692000
Houston, TX
77269-2000
800/231-0900
Reader service no. 627

Dell Computer Corp.
9505 Arboretum Blvd.
Austin, TX
78759-7299
800/426-5150,
512/338-8700 (fax)
Reader service no. 628

Flight Simulator
Microsoft Corp.
One Microsoft Way
Redmond, WA
98052-6399
800/426-9400,
206/883-8101 (fax)
Reader service no. 629

FormTool
BLOC Publishing
800 S.W. 37th Ave.
#765
Coral Gables, FL
33134
305/444-0903,
305/445-5010 (fax)
Reader service no. 630

Grammatik
Reference Software Int'l
330 Townsend St.
#123
San Francisco, CA
94107
800/872-9933,
415/541-0509 (fax)
Reader service no. 631

Hardcard II XL
Plus Development
1778 McCarthy Blvd.
Milpitas, CA
95035-7421
800/624-5545,
408/434-3309 (fax)
Reader service no. 632

Harvard Graphics
Software Publishing Corp.
1901 Landings Dr.
Mountain View, CA
94043
415/962-8910
Reader service no. 633

HP DeskJet 500
Hewlett-Packard
Customer Information Center
19310 Pruneridge Ave.
Cupertino, CA 95014
800/752-0900
Reader service no. 634

HP LaserJet III
Hewlett-Packard
Reader service no. 635

HP ScanJet Plus
Hewlett-Packard
Reader service no. 636

Jumbo 120
Colorado Memory Systems
800 S. Taft Ave.
Loveland, CO 80537
303/669-8000,
303/669-0401 (fax)
Reader service no. 637

Lantastic AE-2
Artisoft Inc.
575 E. River Rd.
Tucson, AZ 85704
602/293-6363,
602/293-8065 (fax)
Reader service no. 638

Microsoft Mouse
Microsoft Corp.
Reader service no. 639

Microsoft Works
Microsoft Corp.
Reader service no. 640

NEC MultiSync 3D
NEC Technologies
1255 Michael Dr.
Wood Dale, IL 60191
800/366-3632,
800/268-3997
(Canada)
Reader service no. 641

NetWare 3.11
Novell, Inc.
122 East 1700 South
Provo, UT
84606-6194
800/526-5463
Reader service no. 642

PageMaker
Aldus Corp.
411 First Ave. S
Seattle, WA 98104
206/628-2320,
206/343-3360 (fax)
Reader service no. 643

Panasonic KX-P1124i
Panasonic Communications and Systems
2 Panasonic Way
Secaucus, NJ 07094
800/742-8086,
201/348-7000 (fax)
Reader service no. 644

Paradox
Borland Int'l
1800 Green Hills Rd.
Scotts Valley, CA
95066-0001
800/331-0877,
408/439-9103 (fax)
Reader service no. 645

PC Connection
6 Mill St.
Marlow, NH 03456
800/243-8088,
603/446-7791 (fax)
Reader service no. 646

PC Tools
Central Point Software
Reader service no. 647

Peachtree Complete
Peachtree Software
1505 Pavilion Pl.
Norcross, GA 30093
800/247-3224,
404/564-5888 (fax)
Reader service no. 648

PenPoint
Go Corp.
950 Tower Ln., 14th floor
Foster City, CA 94404
415/358-2000,
415/345-9833 (fax)
Reader service no. 649

PKZip, PKUnzip, PKSFX
PKware, Inc.
9025 N. Deerwood Dr.
Brown Deer, WI 53223
414/354-8699,
414/354-8559 (fax)
Reader service no. 650

Procomm Plus
DataStorm Technologies, Inc.
P.O. Box 1471
Columbia, MO 65205
800/333-4559,
314/875-0595 (fax)
Reader service no. 651

Q&A
Symantec
Customer Service
10201 Torre Ave.
Cupertino, CA
95014-2132
408/253-9600,
408/252-4694 (fax)
Reader service no. 652

Quattro Pro
Borland Int'l
Reader service no. 653

Quicken
Intuit
P.O. Box 3014
Menlo Park, CA
94026-3014
800/624-8742
Reader service no. 654

SatisFaxtion
Intel Corp.
Reader service no. 655

Smartmodem 2400
Hayes Microcomputer Products, Inc.
P.O. Box 105203
Atlanta, GA 30348
404/441-1617,
404/449-0239 (fax)
Reader service no. 656

Time Line
Symantec
Reader service no. 657

TI TravelMate 2000
Texas Instruments Information Technology Group
P.O. Box 202230
Austin, TX
78720-2230
800/527-3500
Reader service no. 658

Toshiba T5200C
Toshiba America Information Systems Computer Systems Division
9740 Irvine Blvd.
P.O. Box 19724
Irvine, CA
92718-9724
800/334-3445
Reader service no. 659

Turbo C++
Borland Int'l
Reader service no. 660

TurboTax
ChipSoft, Inc.
6330 Nancy Ridge Rd.
#103
San Diego, CA 92121
619/453-8722
Reader service no. 661

VGA Wonder VIP 512
ATI Technologies
3761 Victoria Park Ave. #1
Scarborough, Ontario
M1W 3S2 Canada
416/756-0718
Reader service no. 662

WordPerfect
WordPerfect Corp.
1555 N. Technology Way
Orem, UT 84057
800/451-5151,
801/225-5000,
801/228-5077 (fax)
Reader service no. 663

Windows 3.0
Microsoft Corp.
Reader service no. 664

For more information about all products listed here, circle reader service no. 903.

TO ALL OF YOU WHO SAID WE'D NEVER BE ON THE SAME LEVEL WITH THE BIG COMPUTER MAKERS.

[illegible] J.D. Power and Associates Computer End User Satisfaction Study: Phase I: Office Based Small to Medium Sized Business.** Responses from Business End Users of 1,784 business sites. [illegible] J.D. Power and Associates. Dell cannot be responsible for errors in typography or photography. Dell is a registered trademark of Dell Computer Corporation. Other trademarks and trade names are used to identify the [illegible]

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3. AST
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6. CompuAdd
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8. Epson
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10. NEC

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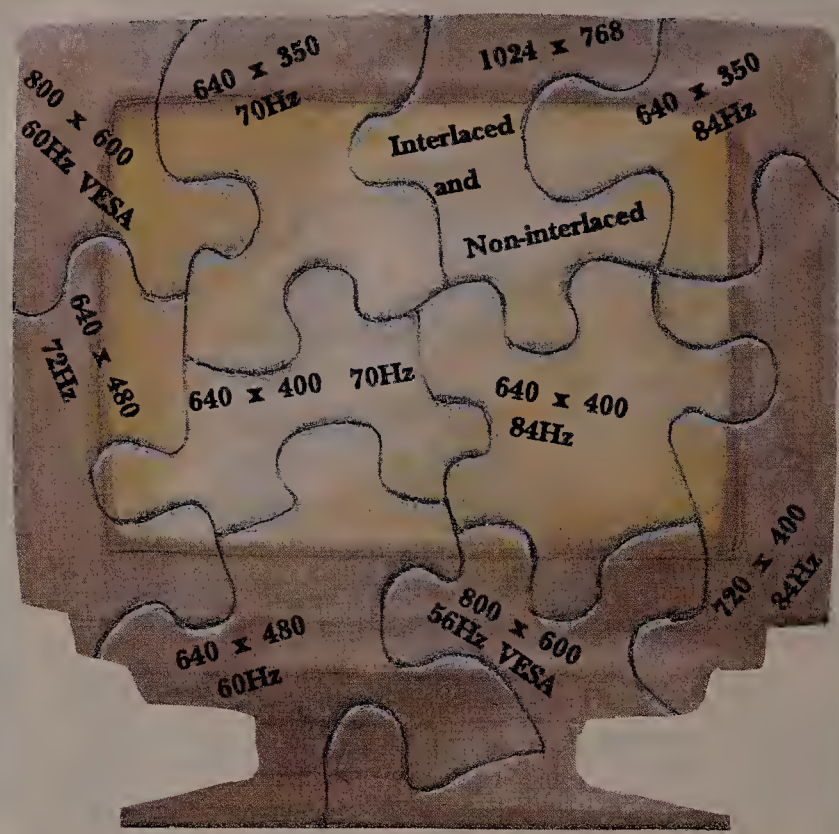

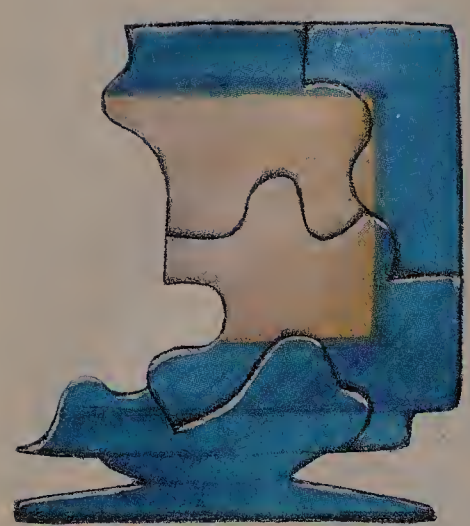

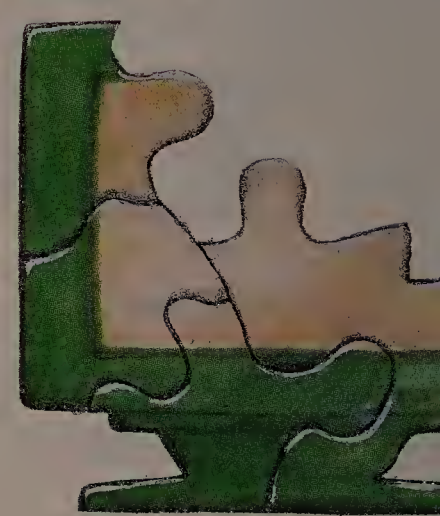

We put all the pieces together.

Chances are, you chose a monitor that suffers from a compatibility problem. Selecting a monitor that suits both present and future needs can be tough. Consider CTX, and you will be puzzle-free! With its 28-38 KHz plus 48 KHz horizontal scanning frequencies, CTX Multimode Super VGA has Total Compatibility — no pieces will be missing from your display.

The CTX Multimode Super VGA offers the ultimate display solution. Features include: super fine CRT (0.28mm dot pitch) providing resolutions up to 1024 x 768 (Non-Interlaced), 90-260 VAC auto-sensing power supply, handy up-front controls and detachable tilt-swivel base. All these plus its affordability make CTX Multimode Super VGA your natural choice of monitors.

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CTX International, Inc.
20530 Earlgate Street, Walnut, CA 91789
Phone (714) 595-6146 Fax (714) 595-6293

CTX (NY)
146 Division Place, Hackensack, NJ 07601
(201) 646-0707 Fax (201) 646-1998

CTX South, Inc.
6090-F Northbelt Parkway, Norcross, Georgia 30071
Phone (404) 729-8909 Fax (404) 729-8805

Chuntex Electronic Co., Ltd. *(Factory)*
6F, No. 2, Alley 6, Lane 235, Pao Chiao Rd.
Hsintien, Taipei Hsien, Taiwan
Phone 886-2-9175055 Fax 886-2-9172736

CTX

Circle 53 on reader service card

HARDWARE SERVICE AND SUPPORT

ASK THE RIGHT QUESTIONS AND YE SHALL RECEIVE — DEPENDABLE SERVICE AND SUPPORT, THAT IS. WITHOUT IT, YOU AND YOUR PC COULD BE UP THE CREEK WITHOUT A JOYSTICK.

JOHN WALKENBACH, SUSAN LUSTY, AND ERIC BROWN

MICHAEL BARTALOS

Sometimes bad things happen to good computers, and sometimes bad computers simply behave like the lemons they are. In either case, when trouble strikes your system, you better hope the vendor can stand behind you with prompt, efficient service and support. Without it, you'll lose money due to downtime or hiring third-party consultants and repair technicians.

If you're the gambling type and you're planning to pick up a PC without sussing out service and support, check these odds: A recent *PC World* survey found that 37 percent of users have a PC that required service. And more than one-quarter of this group have survived two or more repair jobs. About half the problems were considered "serious" or "very serious," and the repairs left nearly one-quarter of the

users without a PC for more than a week (see accompanying charts).

The good news is that about 65 percent of users were "very satisifed" with their PC vendors' service, and repair performance, and 67 percent were either "satisfied" or "very satisfied" with the technical support. As for the remaining users, it's a good bet that many of them failed to check out service and support before they made their buys.

SLEUTHING SERVICE AND SUPPORT

As computers become more and more alike, the importance of service and support rises—it's often the key factor in choosing between systems that are equally fast, expandable, and affordable. But how do you know what to look for, and how can you be sure the vendor will deliver?

Evaluating service and support is always something of a guessing game, but you can do a few things to get a realistic picture. First, ask your friends and associates if they've had any dealings with the vendor in question. Second, search computer magazines for consumer items. Every month *PC World*'s *Consumer Watch* column offers tips on evaluating support and reports on readers' experiences with vendors. And *PC World* reviews now evaluate each vendor on the quality and accessibility of technical support as well as the stated policies for service and repairs.

In the final analysis, however, you have to check service and support policies carefully and question your dealer or mail-order salesperson. The accompanying table shows the standard policies of 33 major vendors, and the following text explains the table entries and gives you more tips on researching your prospective vendor's service and support.

SERVICE AND SUPPORT

Company	Warranty (months)	Money-back guarantee (months)	Maximum months on-site service/price by company	Overnight replacement of parts under warranty	Corporate/custom support plans	END USER SUPPORT PROVIDED BY MANUFACTURER: Free technical support	Toll-free technical support line
ALR	12	0	48/[1]	Y	N	Y	N
ACER	24	0	12/[1]	Y	N	N	N
AMERICAN MITAC	12	1	12/free	Y	N	Y	Y
ARCHE TECHNOLOGIES	24	0	24/$149	Y	N	Y	Y
AST RESEARCH	12	0	0	Y	Y	Y	Y
AUSTIN COMPUTER SYSTEMS	12	1	12/free	Y	Y	Y	Y
COMPAQ	12	0	0	N	N	Y	Y
COMPUADD	12	1	[3]	N	N	Y	Y
DELL COMPUTER	12	1	12/free	Y	Y	Y	Y
EPSON AMERICA	12	0	0	Y	N	N	N
EVEREX SYSTEMS	12	0	[5]	N	Y	Y	N
GATEWAY 2000	12	1	12/free	Y	Y	Y	Y
GRID SYSTEMS	12	0	36/[1]	Y	Y	Y	Y
HEWLETT-PACKARD	12[6]	0	[7]	N	Y	N	N
HYUNDAI ELECTRONICS AMERICA	18	N	18/[1]	[9]	N	N	N
IBM	12	0	0	Y	Y	N	N
LASER COMPUTERS	12	0	12/free	N	N	Y	N
LEADING EDGE	20[11]	N	6/free	N	Y	Y	Y
MICRO EXPRESS	15[12]	1	12/$50	Y	Y	Y	Y
MIS COMPUTER SYSTEMS	12	1	12/[1]	Y	Y	Y	Y
NCR	12	0	12/[1]	Y	Y	N	Y
NEC TECHNOLOGIES	12	0	0	Y	Y	Y	Y
NORTHGATE COMPUTERS	12	1	12/free	Y	Y	Y	Y
OLIVETTI	12	0	12/free	Y	Y	Y	Y
PACKARD BELL	12	0	12/free[14]	N	N	Y	Y
SAMSUNG INFORMATION SYSTEMS	12	0	0	N	N	Y	Y
SWAN TECHNOLOGIES	24	1	24/free	Y	N	Y	Y
TANDY	12	1	36/[1]	Y	Y	Y	N
TWINHEAD	12	0	12/free	Y	Y	Y	Y
WANG LABORATORIES	12	1	0	N	Y	Y	Y
WYSE TECHNOLOGY	12	0	60/[1]	N	N	Y	Y
ZENITH DATA SYSTEMS	12	0	24[1]	[15]	Y	N	N
ZEOS	12	1	12/$49	Y	Y	Y	Y

1 Price depends on configuration.
2 Company sells direct, does not use dealer channel.
3 386 and 486 12/free; 286 12/[1].
4 Level I machines only.
5 Step systems 12/free; Tempo systems 3/free, extra 9/$80.
6 Or 3 months on site.
7 486 12/free; 286 and 386 12/$99–$153.
8 If you buy a service contract.
9 If dealer is on the Hyundai T.E.A.M. program.

Warranty If there's not at least a one-year warranty on parts and labor, forget it. Most problems will occur in the first year, but a longer warranty is a nice insurance policy. These days, 24 months is not uncommon, and some companies will carry you three or four years. Also look for a 30-day money-back guarantee.

Service and replacement plans When buying hardware, service and replacement issues are more important than technical support. Look for at least 12 months of free or reasonably priced on-site service—

					DEALER SUPPORT REQUIRED BY MANUFACTURER					
Daily support (hours)	Weekend support	Electronic bulletin board	Technical fax support	Remote diagnostics	Vendor-to-dealer support	Dedicated support staff required	Support staff training required	Dedicated support line for dealers	Inventory/parts requirement	Frequency dealer authorization is reviewed (months)
11	N	Y	Y	N	Y	Y	Y	Y	Y	3
11	N	Y	Y	Y	Y	Y	Y	Y	Y	3
10	N	Y	Y	N	Y	N	N	Y	N	12
9.5	N	Y	Y	N	Y	Y	Y	Y	Y	12
11	Y	Y	Y	N	Y	Y	Y	Y	Y	1
12	Y	Y	Y	Y	2	2	2	2	2	2
12	N	N	N	N	Y	Y	Y	Y	Y	12
11	N	Y	Y	N	2	2	2	2	2	2
15	Y	Y	Y	N	2	2	2	2	2	2
9	N	N	N	N	Y	Y	Y	Y	4	12
11	N	Y	Y	N	Y	Y	Y	Y	Y	12
18	Y	Y	Y	N	2	2	2	2	2	2
11	N	Y	N	Y	2	2	2	2	2	2
11	8	Y	Y	N	Y	Y	Y	Y	N	12
0	N	N	N	N	Y	N	Y	Y	9	0
24[10]	N	N	N	N	Y	N	Y	Y	Y	12
10	10	Y	Y	N	Y	N	N	Y	N	3
11	N	Y	Y	N	Y	Y	Y	Y	Y	12
9	N	N	Y	N	2	2	2	2	2	2
12	Y	N	Y	N	Y	Y	Y	N	N	12
9	Y	Y	Y	Y[13]	Y	N	N	Y	Y	12
10.5	N	Y	N	Y	Y	Y	Y	Y	N	1
24	Y	Y	Y	Y	2	2	2	2	2	2
8.5	8	N	Y	N	Y	Y	Y	Y	N	12
16	10	Y	Y	Y	Y	Y	Y	Y	Y	6
8.5	N	Y	Y	N	Y	N	Y	N	Y	3
12	Y	Y	Y	N	2	2	2	2	2	2
8.5	N	Y	N	N	Y	N	N	Y	N	12
9	N	Y	Y	N	Y	N	N	N	N	12
12	N	N	N	N	Y	Y	Y	Y	Y	12
10	N	Y	Y	N	Y	Y	Y	N	Y	12
0	N	N	N	N	Y	Y	Y	Y	Y	12
24	Y	Y	Y	N	2	2	2	2	2	2

[10] Automated voice message.
[11] Or 6 months on site.
[12] 24 months for all 486, 386/33, and 386/40 machines.
[13] 486/33 Level 4 machines and higher.
[14] 13- to 36-month extension; price depends on configuration.
[15] With on-site contract only.

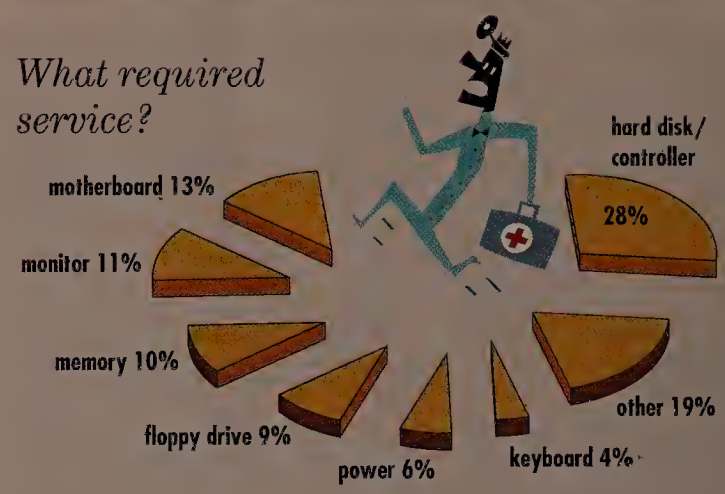
as a rule of thumb, more than $100 a year is too much. If downtime is unacceptable, you'll want assurance that defective parts that are under warranty can be replaced within 24 hours.

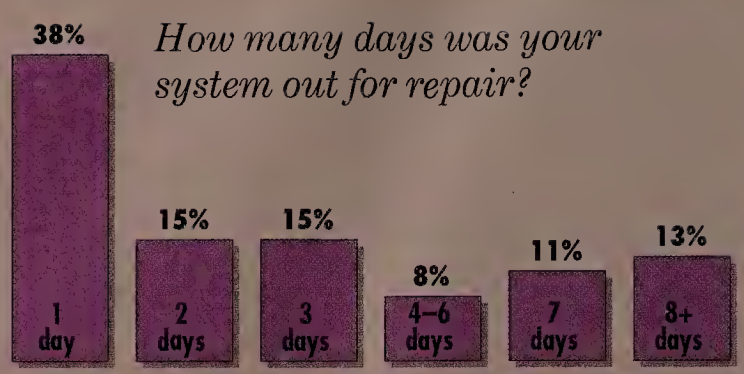
Telephone support Sometimes you can fix a problem on your own, but usually you'll need some kind of help. Look for free—and preferably toll-free—telephone support that's available at least 9 hours a day. If you work on weekends, make sure the support staff does too.

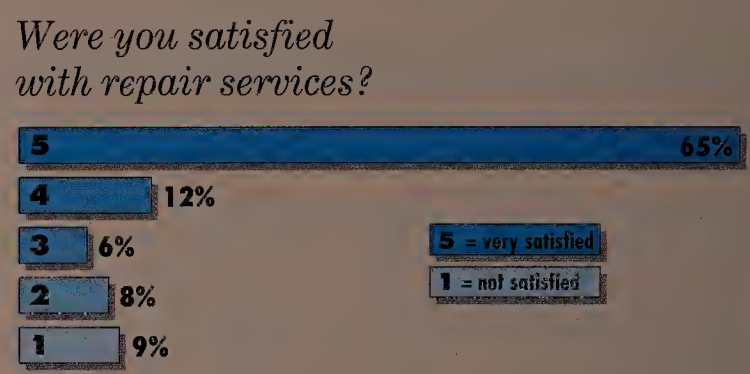
If you can, check the quality and responsiveness of the support before you buy. Is it difficult to get through? Do you wait on hold for long periods of time? Do technicians promise to call you back soon but keep you waiting by the phone for hours? Do technicians refuse to answer, give inaccurate responses, or rush through over-

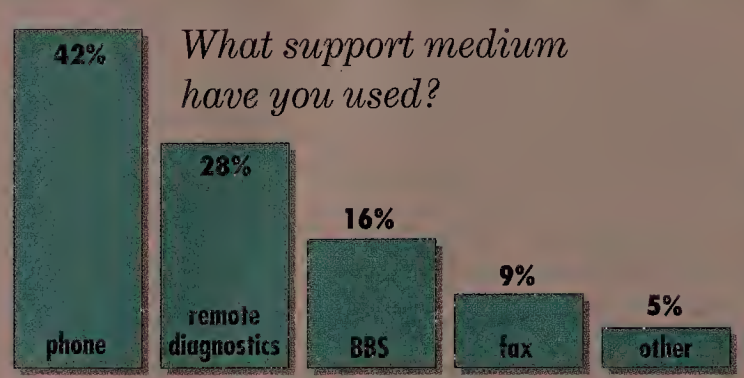
SERVICE AND SUPPORT BY THE NUMBERS

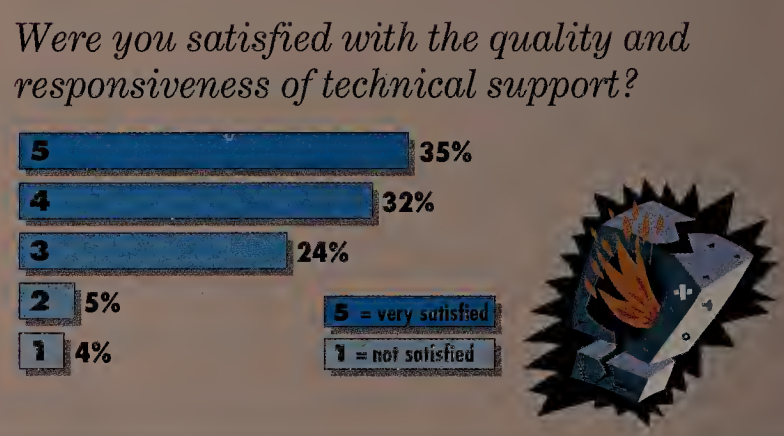
What are the most common hardware problems, and how satisfied are users with repairs and technical support? Check these charts to learn what real people think about the service and support they've received.











ly technical explanations? If so, cross them off your list.

Other support services The more support media the better. Electronic bulletin board services (BBS's) let you dial in by modem, leave questions, and dial back later to retrieve the answers. If you can fax your questions, you can get help even if your PC is down for the count. Remote diagnostics is an increasingly popular approach to support. The technicians send you a remote communications package such as *Carbon Copy Plus* so they can dial in via modem and operate your computer as if they were there.

Dealer services There are two types of computer vendors: those that sell direct via mail and those that sell through dealers. Ideally, products sold through dealers should also be supported by central support services from the manufacturer. If not, make sure there's a dealer nearby, and make sure the vendor requires that dealers provide sufficient service. The vendor should demand that its dealers offer a dedicated support staff that's properly trained, and the dealers should be able to call the vendor for direct support. It's also essential that the dealers have inventory and parts on hand for quick replacements.

Top-notch service and support doesn't mean your computer will be glitch-free. But at least it won't stay broken for long.

John Walkenbach is a contributing editor, Susan Lusty an assistant editor, and Eric Brown a senior editor for PC World.

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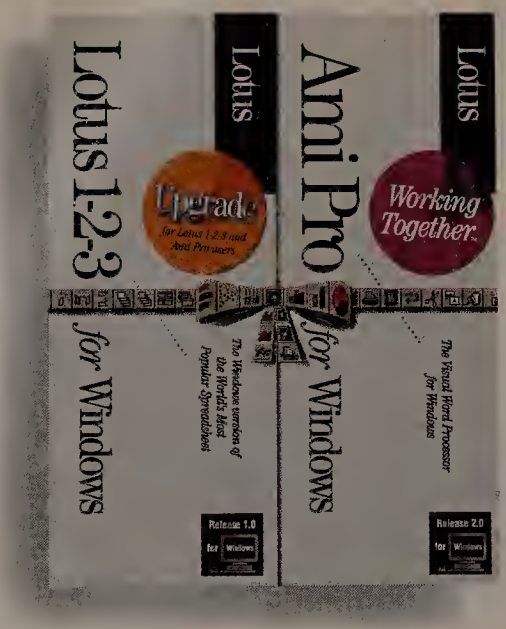

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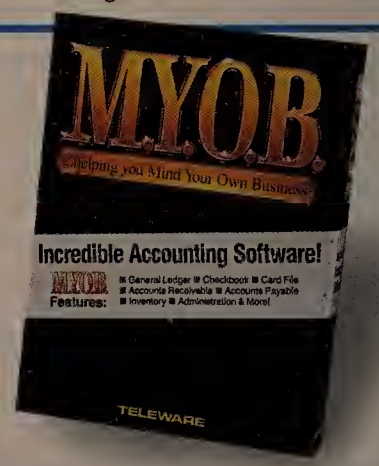

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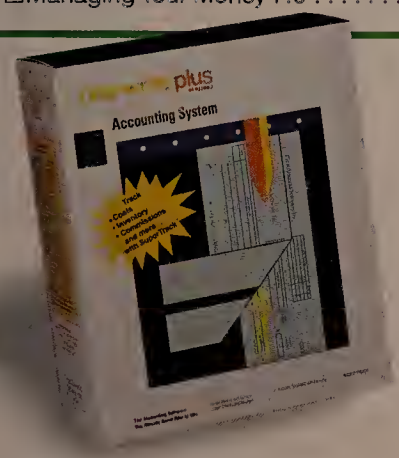

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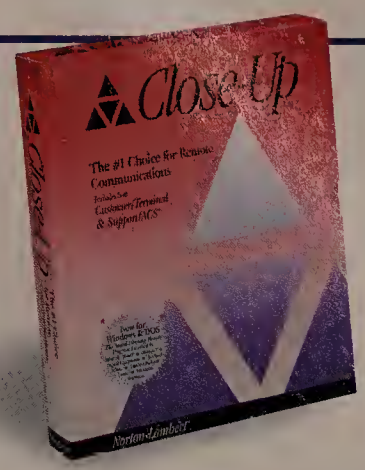

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2473 ▣ Instant ORG Charting! 1.0 . . . . . 125.
8162 ▣ ABC Flowcharter 1.1 . . . . . 189.

Sitka ... NCP
6675 ☐ TOPS Network Bundle 3.0 . . . . . 159.
3720 Flashcard 2.1 *(AppleTalk network card)* . 155.

Softlogic Solutions ... NCP
3542 ☐ Software Carousel 5.0 . . . . . 55.

Software Publishing ... NCP
3496 ☐ Professional Write 2.2 . . . . . 169.
9638 ☐ Professional Write Plus 1.0 . . . . . 169.
3482 ☐ Harvard Graphics 3.0 . . . . . 419.
6600 ▣ Superbase 4 for Windows 1.3 . . . . . 429.

Software Toolworks ... NCP
9859 ▣ Word for Word/Windows 4.2 . . . . . 47.

Solution Systems ... NCP
7977 ☐ Brief 3.1 *(Programmer's Editor)* . . . . . 189.

Spinnaker ... NCP
1415 ▣ PFS: WindowWorks 1.0 . . . . . 129.
7604 ▣ PLUS for Windows 2.0 . . . . . 289.

Stac Electronics ... NCP
1409 ▣ Stacker 1.1 . . . . . 89.

Symantec ... NCP
6397 ☐ The Norton Backup 1.2 *(Windows/DOS)* 89.
3146 ▣ The Norton Utilities 6.0 . . . . . 119.
3425 ☐ Q&A 4.0 . . . . . 269.
7999 ▣ Norton Anti-Virus 1.0 . . . . . 89.
2359 ☐ The Norton Desktop for Windows . . . . 105.

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9847 ▣M.Y.O.B. for Windows . . . . . 139.
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3804 ☐WordPerfect 5.1 . . . . . 265.
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8886 ▣SimEarth . . . . . 45.
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1334 ☐Chuck Yeager Air Combat Trainer . . . . . 42.
Harvard Associates ... NCP
2324 ▣PC Logo 3.0 . . . . . 59.
HyperGlot Software ... NCP
(French, German, Italian, Spanish available.)
☐Word Torture for Windows . . . . . ea. 34.
☐Word Torture 3.0 . . . . . *ea.* 29.
Microsoft ... NCP
7881 ☐Entertainment Pack for Windows 1.0 . . 29.
2858 ☐Flight Simulator 4.0 . . . . . 39.
8270 ▣Aircraft and Scenery Designer 1.0 . . . . 29.
Microsoft Press (Books)
8129 Running Windows *(2nd Edition)* . . . . . 22.
8136 Running Microsoft Excel . . . . . 22.
Penton Overseas ... NCP
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4659 ▣Chessmaster 2100 *(CP)* . . . . . 35.
7372 ☐World Atlas 2.0 . . . . . 42.
Stone & Associates ... NCP
3439 ▣2nd Math 4.2 . . . . . 27.
Toyogo ... NCP
7676 ▣Nemesis Go Master Deluxe 4.7 . . . . . 88.
True BASIC, Inc. ... NCP
▣Kemeny/Kurtz Math Series . . . . . *each* 45.
Walt Disney Computer Software ... CP
2629 ▣Mickey's 123's . . . . . 35.
2624 ▣Mickey's ABC's . . . . . 35.

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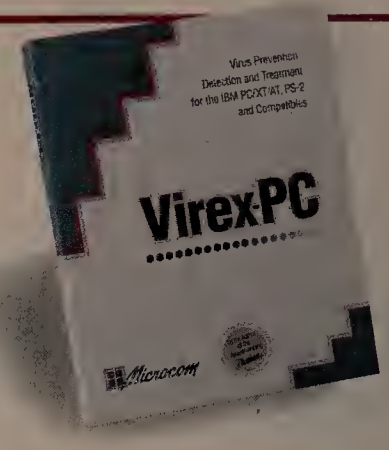
Acme/SAFE Power Systems ... 2 years
1948 Safe 300 . . . . . 199.
6747 Safe 400S . . . . . 399.
American Power ... 2 years
7108 Smart UPS 400 . . . . . 339.
7105 Smart UPS 600 . . . . . 469.
6811 Back-UPS 360 . . . . . 219.
7106 Back-UPS 520 . . . . . 329.



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2012 Graphics Ultra w/VGA *(w/1 MB)* . . . . . 619.
1825 2400etc/i Modem *(w/9600 SendFax)* . . . 139.
9620 9600etc/e Modem . . . . . 379.
Boca Research ... 5 years
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7150 BOCARAM/AT PLUS *(2 MB)* . . . . . 219.
7139 *(4 MB)* . . . . 329. 7138 *(8 MB)* . . . . 539.
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1812 LabelWriter II Printer . . . . . 195.
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2357 LQ-1170 *(136 col., 330 cps)* . . . . . 669.
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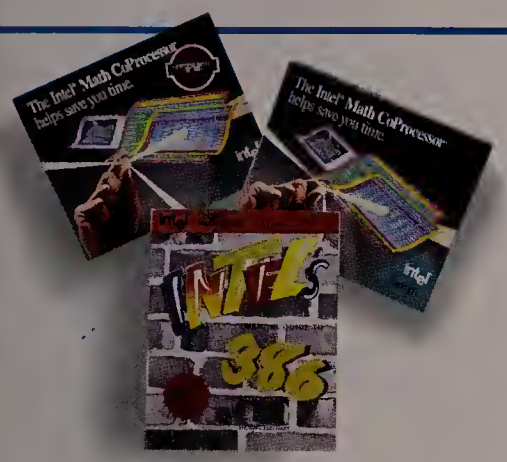

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6420 2400EX MNP Modem ..... 229.
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5336 Above Board Plus 8 2 MB ..... 449.
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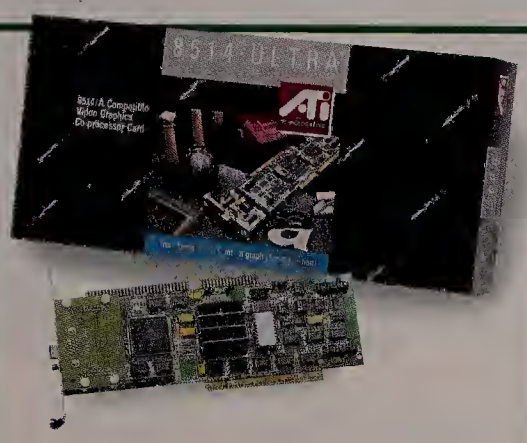
7271 *Inport* ..... 79. 6330 *PS/2* ..... 79.



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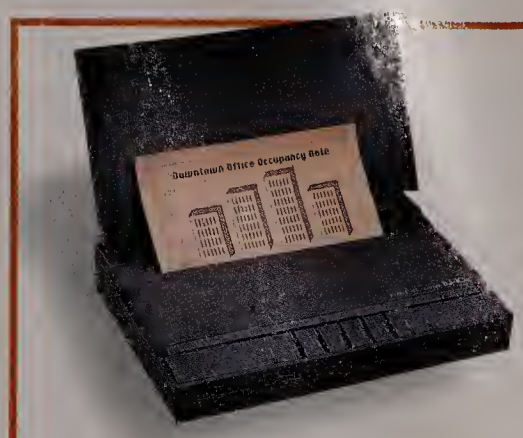

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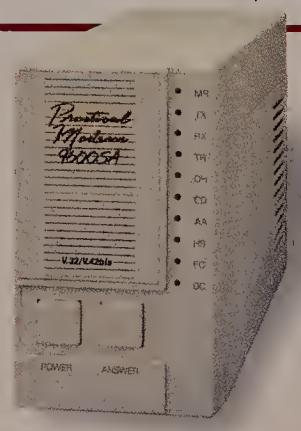

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	TheComplete PC ... 2 years	
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4951	720k Drive for PC/XT *(3½")*	69.
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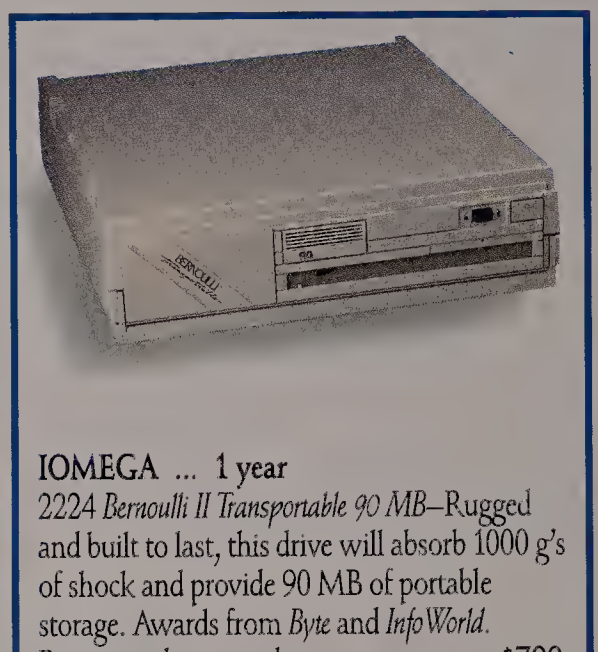
2792	3½" DS/DD 720k Diskettes *(Qty. 10)*	13.
2793	3½" DS/HD 1.44Mb Diskettes *(Qty. 10)*	21.



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6375	3½" DS/HD *(3 Pack)*	49.
8185	QD 2040 Tape Cartridge	19.
1895	QD 2120 Tape Cartridge	22.
	3M ... lifetime	
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6065	DC 2080 Tape Cartridge	25.
3944	DC 600 Tape Cartridge	29.
5679	DC 6150 Tape Cartridge	29.

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5510	1 MB x 9 SIMMs *(80 nanosecond)*	call
5746	1 MB Chips *(80 ns, set of 9)*	call
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- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices and promotions subject to change without notice.
- To order, call us Monday through Friday 8:00 a.m. to 1:00 a.m., or Saturday 9:00 a.m. to 5:30 p.m. Eastern Time. You can call our business offices at 603/446-3383 Monday through Friday 9:00 a.m. to 5:30 p.m.

Hayes ... 2 years
7391 *Ultra 96 Modem*—Get ultra high modem performance & error control without sacrificing compatiblity. Supports CCITT V.32, V.42bis, Express 96, MNP Level 2-5, & standard 2400/1200/300 bps communications . . $669.

SHIPPING

Note: Accounts on net terms pay actual shipping.

Continental US:

- For heavy hardware items such as printers, monitors, Bernoulli Boxes, etc. pay actual charges. Call for UPS 2nd-Day & Next-Day-Air.
- For all other items, add $3 per order to cover UPS Shipping. For such items, we automatically use Airborne Express at no extra charge if you are more than 2 days from us by UPS ground.

Hawaii:

- For monitors, printers, Bernoulli Boxes, computers, hard drives, and power backups, actual UPS Blue charge will be added. For all other items, add $3 per order.

Alaska and outside Continental US:

- Call 603/446-7721 for information.

ON SITE

CALL 911 SUPPORT

Keeping 2000 PC users productive requires a foolproof support strategy. Here's how the nation's largest discount brokerage went out of house to eliminate its support headaches.

Bronwyn Fryer

Quick. Whose discount brokerage firm has 1.4 million customers, $626 million in annual revenues, and employs 2000 PC users who enjoy state-of-the-art technical support? Charles Schwab's, of course.

"Without our PCs and other systems, our sales and support staff wouldn't be able to provide the up-to-the-minute service our customers have come to expect," says Schwab.

If an employee can't figure out how to use a new software program feature, or get a printer to cooperate, both productivity and customer service are at risk. Charles Schwab Corporation meets this challenge with its "work smarter, not harder" approach to technical support. By hiring an outside consulting firm to provide soup-to-nuts support services, the company has managed to save the sanity of sales and technical staff, recover the equivalent of $150,000 each year in personnel services, and gain an untold fortune in employee productivity.

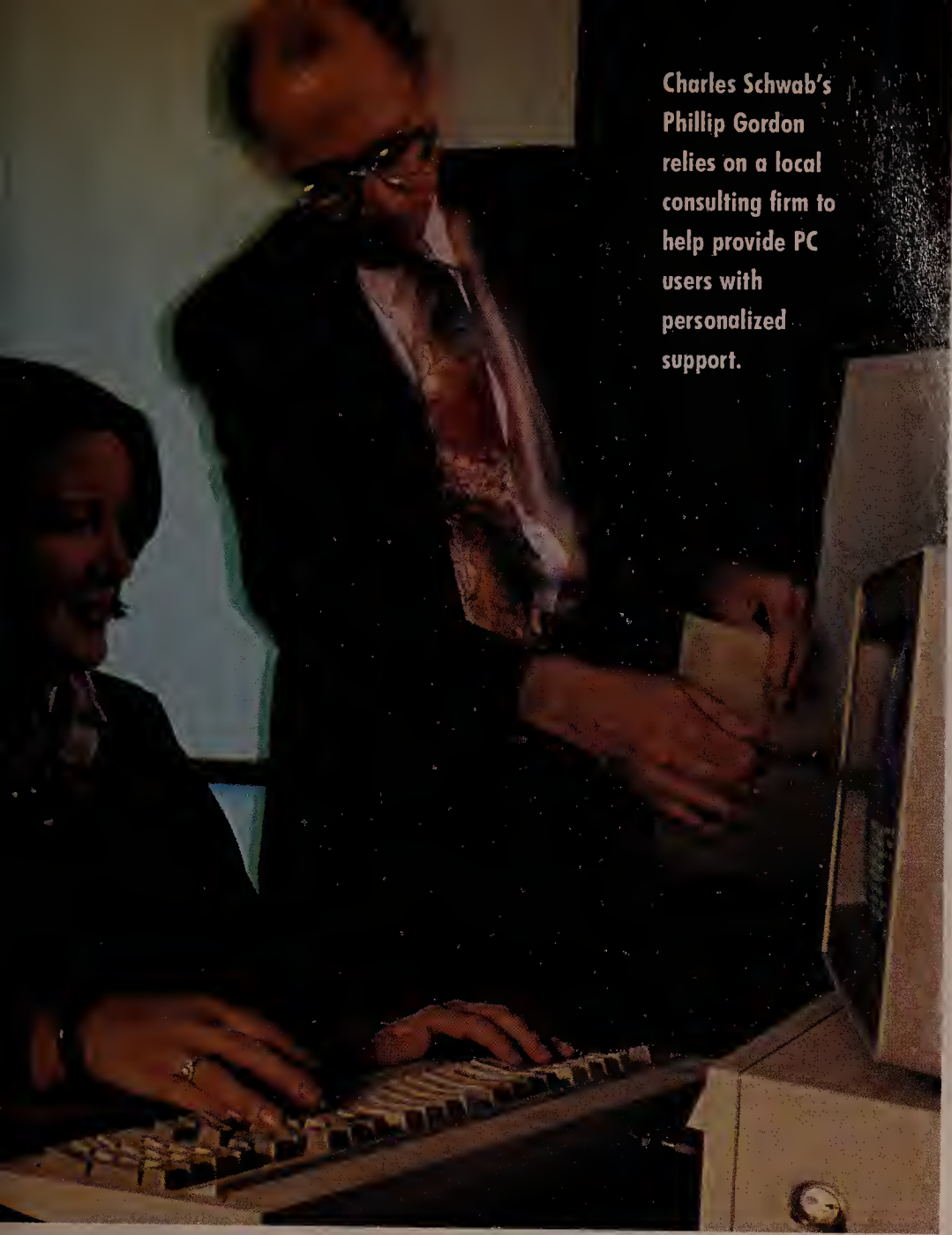
Charles Schwab Corporation has earned a solid reputation as the most aggressive yet service-oriented firm in the discount industry. To uphold that reputation, employees operate at a fever pitch to keep on top of $36 billion worth of portfolio investments.

Like many large brokerages, Charles Schwab Corporation is a computer-intensive environment. Mainframe computers in New York do the bulk of the transaction processing, while a total of 2000 personal computers are installed on desktops at the San Francisco headquarters and in 120 offices around the country. The PCs double as 3270 terminal emulators that make financial and customer data stored on the mainframes available to sales and support staff. More than half of the company's 3000 employees spend their days glued to PCs, which they use to keep tabs on the stock market, write correspondence and reports, and process some 4000 transactions each month. Employees also work with any of 30 off-the-shelf word processing, spreadsheet, and contact management packages, and 500 systems are connected to each other via a token-ring network.

Setting up streamlined support for this complex system didn't happen overnight. Formerly, PC users asked their neighbors, departmental "gurus," or the technical staff for answers to common problems. "Most of these problems are what we call the RYDM ['Read Your Damn Manual'] variety," says Phillip Gordon, manager of Schwab's End User Computing Systems (EUCS) group. "People want immediate answers. That's understandable, but if you're the recipient of these kinds of questions, you need a lot of patience."

Patience, however, is a two-way street. Frequently a questioner would have to wait hours before finding a solution to a problem. With a 40-to-1 staff-to-EUCS employee ratio, Gordon's group was overloaded. Between answering calls, evaluating systems, and consulting, "the average day was like hell. It

JAMIE TANAKA



Charles Schwab's Phillip Gordon relies on a local consulting firm to help provide PC users with personalized support.

THE BOTTOM LINE

PROBLEM:

- In-house staff takes all support calls
- Slow response to questions
- Interrupts employees
- Prevents progress on critical-path projects

SOLUTION:

- Offload front-line calls and troubleshooting to support service

BENEFITS:

- Improved productivity
- Equivalent of $150,000 in staff costs recovered
- Streamlined support

was Burnout City time," Gordon says. Meanwhile, it sometimes took as long as 24 hours to get back to a caller.

FISHING FOR CONSULTANTS

In early 1990, Gordon decided to look for a consulting firm that specialized in hands-on technical support. This, he reasoned, would make end users more productive and free his group to concentrate on what they were hired to do—help Schwab businesspeople develop the critical applications that affect the bottom line.

Gordon wanted to find a local company that could not only provide telephone support, but also make "house calls." The other issue he considered was price. "A lot of firms wanted to sell me high-priced, on-site consultants, and I'd have to provide them with a desk too," Gordon says. He settled on a San Francisco-based firm called Computer Hand Holding (CHH). "It sounded like a dating service," he laughs.

The annual contract with CHH requires the consulting firm to handle Schwab's front-line telephone support, identify problems, and make housecalls when necessary. CHH also routes calls to IBM, the maintenance contractor, for all hardware problems.

MANAGING THE RELATIONSHIP

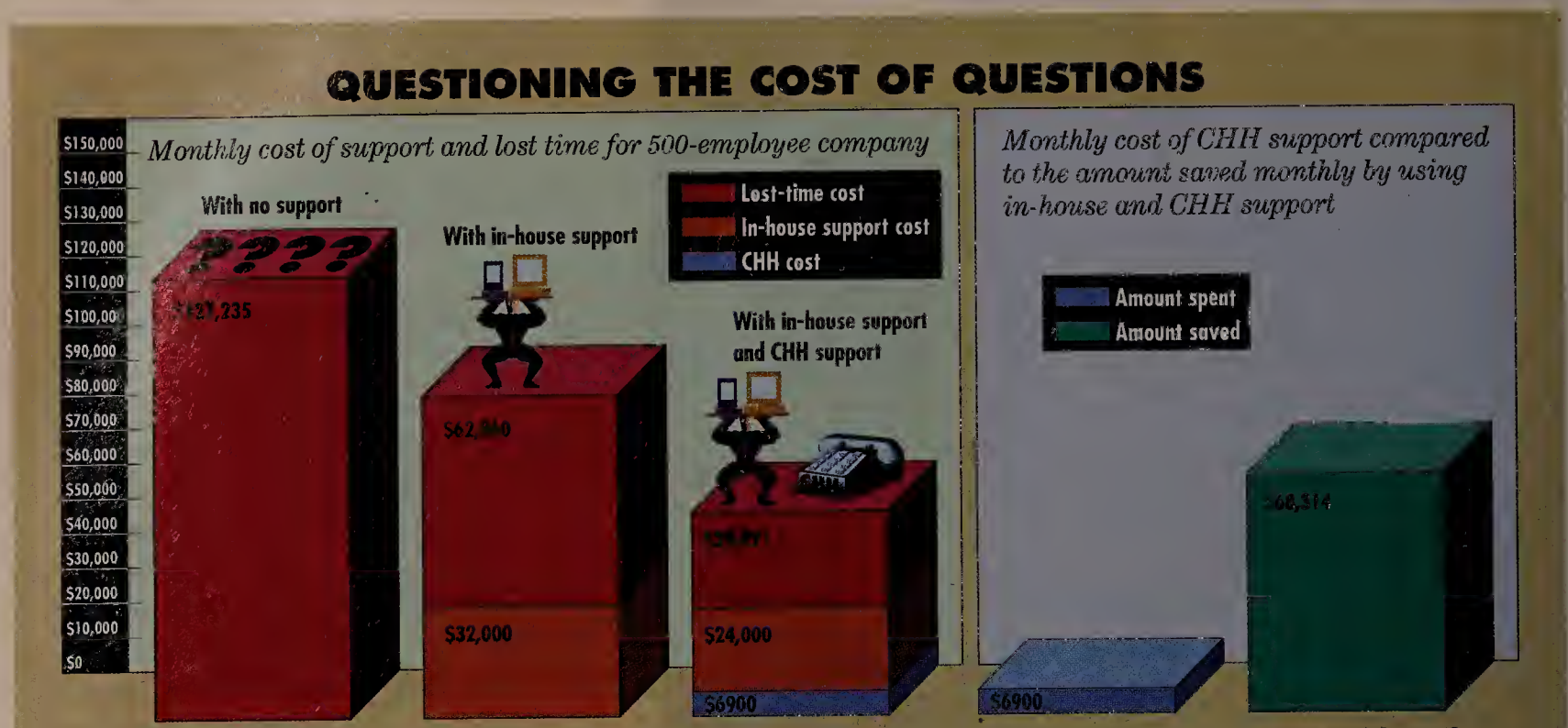
CHH's technical support has eliminated hours of "busy work" for Gordon's staff. Ironically, however, overseeing the relationship with the vendor has required more management time than the in-house system did. "This is because you can't watch their staff as closely," Gordon notes. "Otherwise, managing the vendor relationship is much the same as working with an in-house staff."

As in any new relationship, establishing trust between CHH and Schwab was the first order of business. He familiarized the consultants with Schwab's systems and handed over the keys to locked drawers where hardware troubleshooting kits were kept.

In working with any outside vendor, it's critical to manage the expectation level of the people who use the service, says Gordon. Even with CHH's high level of service, Gordon finds that end users often expect the consultants to do "everything, including fixing unfixable software bugs, or physically installing or running applications." To keep expectations in line, Gordon's group publishes a biannual charter of services.

It's equally important to keep the vendor happy. "You have to maintain close contact with the consultants, and make sure that they're not getting abused by users," Gordon says. "Vendors' levels of service remain high when they feel they have good communication with you."

To monitor the service's effectiveness, Gordon requires the consultants to log all calls on Schwab's mainframe-based call-tracking system. As calls come in, the consultant opens a call "ticket" on the IBM mainframe and closes it as the problem is solved. As with the in-house technical support group, CHH solves 70 percent of the



Computer Hand Holding (CHH), a company that provides out-of-house technical support, estimates that without the help of a support organization, an employee will spend 1.68 hours trying to find the answer to a question. In a 500-employee company, this lost time costs the company $127,235 a month. With an in-house help desk, end users spend .83 hours on a problem, lowering the cost of lost time (including support salary) to $94,860. For $6900 a month, a support vendor can cut question time to .37 hours—lowering the monthly lost-time cost to $58,921.

problems—the difference being that CHH answers almost all callers' questions immediately.

SUPER SUPPORT

In spite of the extra management required, the decision to contract out support is paying off. "The service has allowed us to minimize waste by removing steps in the support process," says Gordon. For example, all Schwab employees have a direct line to CHH, which in turn guarantees that the telephone never rings more than three times before a consultant answers the call; in the rare cases when a callback is required, the caller never has to wait more than an hour.

CHH is paid on a monthly rather than per-call basis, so users can call whenever they need help. CHH consultants use a PC-based diagnostic system that leads through a series of branching screens related to the caller's question. If it's about a printer problem, for example, the next screen will ask whether the printer is unplugged, turned off, or has a paper jam.

A *Windows*-based tracking system ensures that CHH has detailed information on each caller's system, including its configuration and a history of past difficulties. The tracking system keeps consultants from having to ask the same questions twice. CHH is also working on a telephone auto-routing system that will immediately send calls to the appropriate consultant.

After six months of CHH service, a survey revealed that 85 percent of the respondents were delighted with the improvement. The improved support has made a big difference in the productivity of Schwab's Financial Advisors Group, according to vice president Jim Hackley. "We can't afford to have people distracted from making sales happen," says Hackley. "We used to have a problem, but now I'm really happy with the support we've received."

THE END OF HEADACHES

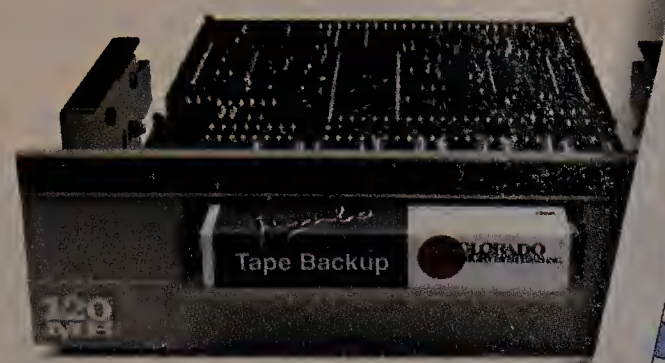
Freed from dealing with the technical support calls, the EUCS group can concentrate on critical projects. "Our technical staff is able work on projects that provide far more value to customers and the company, and that take advantage of their technical and analytic skills," Gordon notes. "We can also schedule work more consistently, because we are not constantly disrupted by first-level support tasks."

In addition, going outside for support has saved money. Formerly, trained EUCS technical staff—whose annual salaries averaged nearly $100,000 each—were spending valuable time answering elementary support questions. Now the group has reassigned those highly paid employees to more productive tasks. "The cost of the service has so far been less than the cost of one full-time employee," says Gordon.

With the new service, one of the company's strategic objectives—to reduce wasted time—has been achieved. "It doesn't make sense for Schwab employees to spend their work hours answering questions about setting up tabs," Gordon notes. "With more effective support, everyone in the company is happier. It is unquestionably a vast improvement."

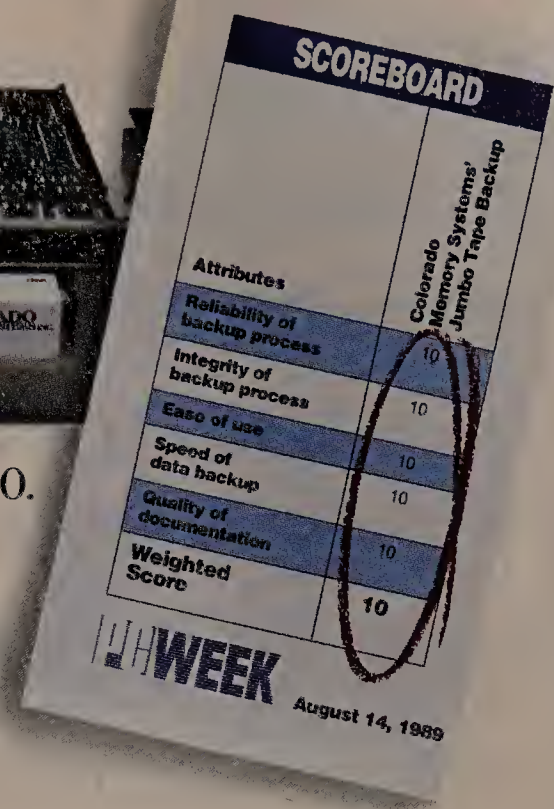
Bronwyn Fryer is an associate editor for PC World.

The perfect performance.



$399

The Jumbo 120.

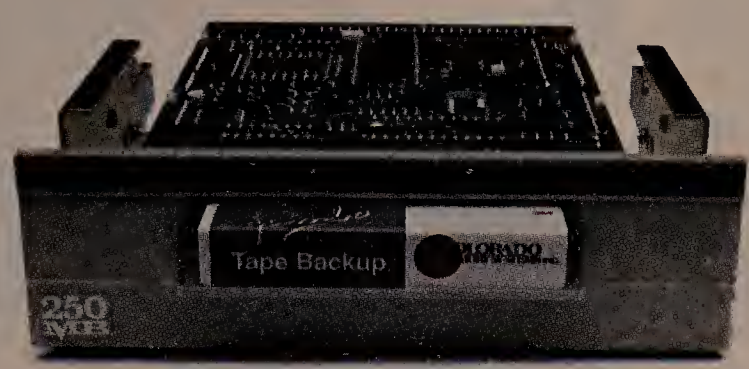


SCOREBOARD

Attributes	Colorado Memory Systems' Jumbo Tape Backup
Reliability of backup process	10
Integrity of backup process	10
Ease of use	10
Speed of data backup	10
Quality of documentation	10
Weighted Score	10

PC WEEK August 14, 1989

The encore.



$499

Introducing the Jumbo 250.

The Jumbo 120 tape backup system scored a perfect 10 in a PC Week poll. Our new Jumbo, the 250, has the capability to store twice as much of your valuable data at twice the speed. Typically 250 megabytes, with data compression. Which begs the question - is there such a thing as more than perfect?

Check out the new Jumbo 250, and the Jumbo 120. Both feature unprecedented reliability, easy installation, unattended backup, data compression, Novell® certification, UNIX®/Xenix® support and QIC compatibility.

For more information, call 1-800-346-9881, fax (303) 667-0921, or write 800 S. Taft, Loveland, CO 80537.

COLORADO MEMORY SYSTEMS INC.

Perfect keeps getting better.

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Circle 46 on reader service card

It fell from the night sky undetected. By morning, it was pushing up innocuously through the moist, warm soil. Perfect. For the entire world would certainly take note soon enough.

In the oxygen-rich environment of earth, our little interstellar transplant experienced accelerated mitosis. On the first day it increased its height by half. On the second day by a third, on the third day by a quarter and so on. Can you determine, at this rate, how long it'll take to achieve its final height of one hundred times its original height?

Keep in mind, as you size up this visitor, that the rate of growth may seem greater at first. As is often the case in business, early growth can be markedly stronger when a product category is new and innovation is rapid. But it can flatten out as the market swells and matures.

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386sx/20, WYSE DECISION 486/25 and WYSE DE

Case in point, personal computers. Meteoric sales at first. Then a slowing. Today, growth is still there, but the incline is less steep. And there are some 300 brands fighting for that sluggishly growing chunk. If it weren't for the surge in notebooks, PC growth would probably be flat as a floppy.

So why on earth, in the midst of all this, would Wyse dare introduce just another line of PCs? We wouldn't. Our Decision Series is a far cry from just another line. With more performance, more flexibility and more ergonomic advantages at–it's true–less cost. All backed by a total service program.

There are several Decision Series models to decide from. Our ultra lightweight DecisionMatesx notebook, the entry-level Decision 386sx/20, a potent Decision 486/25 and the tower of power Decision 486/33T. All in all, perhaps the most underrated line of PCs on the market.

From notebook to tower, the Wyse Decision Series PCs offer a rich assortment of features and ergonomics at more than competitive pricing.

Why so? Because as we've grown over the years, our name has become synonymous with terminals. So much so that the very notion of a Wyse PC took a little getting used to at first.

Of course, the introduction of our *Unix World* award-winning 9000i helped change things. This 160 MIPS, multi-user, true symmetric multiprocessor system makes it very clear that Wyse is a bit more than just the second largest terminal manufacturer.

The recent introduction of our eyebrow-raising DecisionMatesx notebook PC should help bring further clarity to the picture. As should this little nugget: according to information released by International Data Corporation in December 1990, guess who ranked second behind only IBM as the primary vendor of PCs to value added resellers? The correct answer appears below in fairly large capital letters. As to the correct answer regarding our mutating extraterrestrial, well, you'll need to turn to page 296 for that.

To receive more information on any of the Wyse Decision Series PCs, and/or a free poster of further Cerebral Aerobics, just call us at 1-800-GET WYSE.

The lesson in all this: if you're contemplating the acquisition of some new terminals, do as you'd normally do and look into Wyse.

If you're contemplating the acquisition of some new PCs, do as you might not normally do. And look into Wyse.

WYSE

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Circle 322 on reader service card

Low-Cost

COMPUTER

AIDED

DESIGN

WHETHER YOU'RE rearranging your office cubicles, doodling a sketch of a new product, or designing a printed circuit board, you'll find computer-aided design (CAD) software an invaluable tool. CAD is like a drawing program, only more precise. You use it to create and place geometric elements without having to deal with the tons of drafting paper and mounds of eraser dust that manual drafting entails. The results are lower design costs, better-quality drawings, and faster turnaround.

For many, the question of which CAD program to buy is a no-brainer. Autodesk's *AutoCAD* dominates the market and is supported by hordes of consultants, trainers, and user groups as well as hundreds of third-party hardware and software developers.

But for casual users, *AutoCAD*'s powerful features and hardware requirements can be daunting. You'll need a fast 386 or 486, a math coprocessor, and at least 4MB of memory and 9MB of disk space. Unless your PC already has the horsepower, you may want to pony up for one of the less-demanding packages listed here. And sophisticated users might find all the drafting power they need for less than *AutoCAD*'s $3500 price.

We've rounded up 35 CAD packages that cost less than $2000. These programs range from simple design software (sometimes called "sketch pads") to feature-rich products aiming to gun down the current CAD king. (For purposes of comparison, we've listed *Auto-*

ILLUSTRATIONS BY PHIL ANDERSON

AutoCAD isn't the only kid on the block. Many packages cost a fraction as much and handle everything from org charts to space planning to full-blown detail drawings.

RALPH GRABOWSKI AND NINA ZOTTOLI

CAD at the top of the table.)

If you're not sure which level of CAD package is right for you, turn to the sidebar "What Type of CAD User Are You?" Then see the following for explanations of the features listed in the accompanying table, along with tips on what to look for in each category.

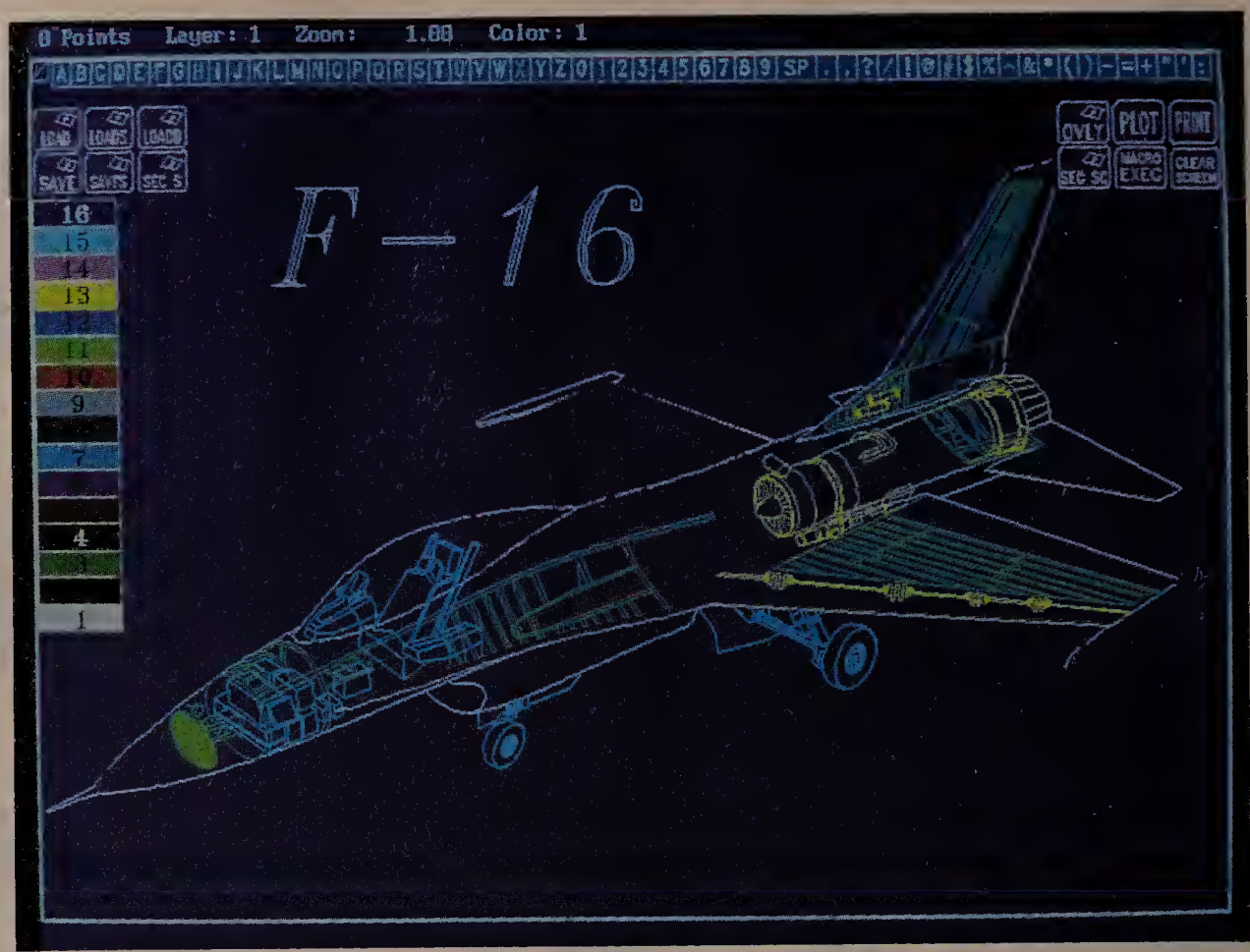
DRAFTING TOOLS

Every CAD package performs four essential functions: drawing, editing, plotting, and data import/export. All have basic 2-D tools for creating lines, arcs, circles, text, and curves and complex lines (polylines) made from many linked line and arc segments.

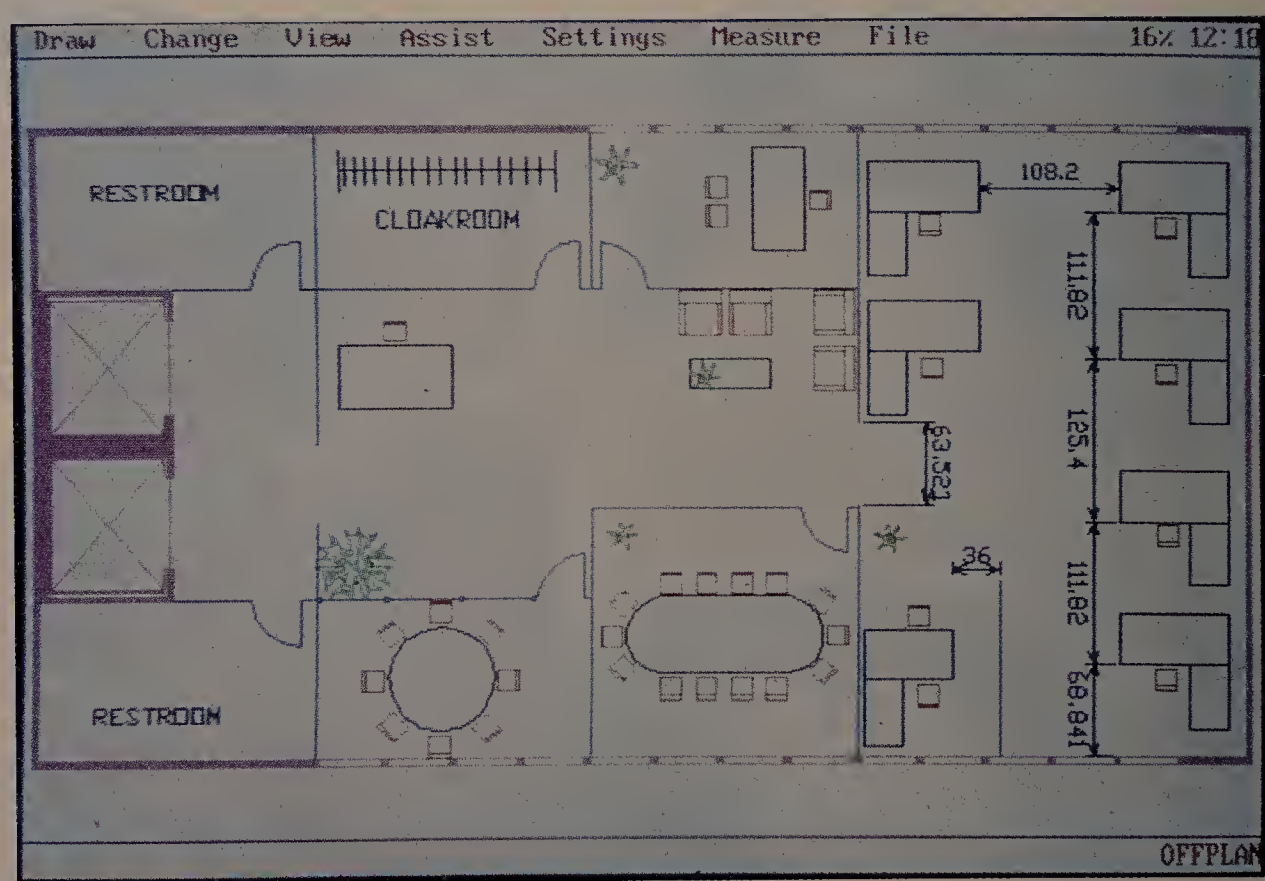
Once you've drawn the lines, you'll need to edit them. Most CAD packages let you copy or rotate objects, move objects to other locations, and *hatch* fill areas with patterns. You can also use the mouse or a digitizing tablet to *snap to* (align precisely with) on-screen elements, such as a grid point or a geometric feature of an object. (Geometric features include the endpoints, intersections, midpoints, and tangents of lines, arcs, and circles.) The more snap options available, the faster you'll be able to draft. Most CAD packages include an undo command for quick erasure of drafting miscues.

You can zoom in to work close up on a detail, pan across a drawing, or zoom out to view the entire picture. If you want to see different views of the drawing at the same time—a must for 3-D work—look for a package that can open multiple windows.

As with manual overlay drafting, most CAD programs let you create drawings using multiple layers. A layer lets you group similar objects for selective viewing, plotting, or exporting. An architect might draw a floor plan on one layer, electrical details on another, and plumbing details on a third, then plot different combinations of layers for each contractor. The more complex a design, the more layers you'll require. Color identifies each layer when the layers are combined.



The multilayer capability of CAD packages is illustrated in this DesignCAD drawing of an F-16 fighter, in which hydraulic, electronic, propulsion, and airframe systems were drawn separately in distinctive colors then brought together in one multilayered view.



This floor plan rendered with Autodesk's AutoSketch is a common management application for CAD. In this plan, even decorative planters are represented. Other common management applications for CAD include work flow diagrams, organization schemes, and network models.

3-D TOOLS

When you draft by hand, you work in two dimensions—

width and height. For most uses, such as creating floor plans or schematic diagrams, 2-D CAD is fine. CAD software that supports three-dimensional design allows you to define an object's depth as well. If you plan to create spatial models or generate code for computer-driven machine tools, you'll need a 3-D program.

There are three ways to represent a 3-D drawing: as a wireframe model, by surface modeling, and through solids modeling. Each method models a progressively more realistic representation of an object; the trade-off is increased computation time.

Wireframe models are the easiest to create and the fastest to display. Drawing a 3-D wireframe is almost identical to drawing in 2-D; the difference is, with 3-D you can draw in any plane in three-dimensional space. A wireframe model can be confusing because it lacks any illusion of depth. To make a wireframe easier to understand, most 3-D packages let you remove edges that would be hidden from view.

Surface models are useful for visualizing objects like proposed building exteriors.

Hidden lines are removed automatically, and you can add shading to surfaces. You can export the coordinates that define the surfaces to other programs for jobs like aerodynamic analysis. If you need to create models such as airplane or car bodies, you'll need a program that can handle complex irregular surfaces.

Surface modeling generates a realistic 3-D drawing, but it's generally easier to represent 3-D objects with solids modeling. Solids modeling uses elementary 3-D objects like blocks, cones, and spheres (instead of lines, arcs, and circles) as building blocks. However, solids modeling is more compute intensive and requires heavy-duty hardware.

CUSTOMIZATION

The best CAD packages let you customize them to meet your standards. For example, the design needs of a landscape architect differ from those of a structural engineer. One places symbols for shrubs and calculates irrigation pipe diameters; the other places symbols for bolts and calculates shear strengths.

Most CAD programs have a macro capability that lets you automatically execute a series of commands, such as for inserting predrawn symbols. Several CAD programs integrate high-level programming languages, such as Pascal, C, and LISP, that let you perform design analyses. Most let you define special fonts or hatch patterns for different types of materials.

Another useful feature is constraint management, which ensures that snapped elements stay snapped regardless of changes to their size or proximity to one another. This is essential for complex models that evolve over time. If you

(continues on p. 222)

WHAT TYPE OF CAD USER ARE YOU?

Depending on your requirements, a low-cost CAD program can fill all your design needs as well as or better than programs costing thousands of dollars. Here are the six major types of CAD users, the kind of jobs they're likely to do, and the features they'll need.

USER: *Casual*
JOBS: Simple space planning, package designs, rough sketches of objects
TOOLS: 2-D drafting tools, DXF compatibility

USER: *Technical illustrators*
JOBS: Precise drawings of machine parts; scientific charts and diagrams
TOOLS: 2-D drafting tools, isometric views, support for laser printers

USER: *Architects*
JOBS: Building and landscape design
TOOLS: 3-D wireframes, programming language, custom fonts, multiple rendered views, third-party libraries of fixtures, automated drawing tools

USER: *Civil engineers*
JOBS: Road and bridge design
TOOLS: 3-D wireframes, curve-fitted polylines, data links to hydrology analysis programs, coordinate geometry (COGO) support, ability to handle large files

USER: *Electrical and electronic engineers*
JOBS: Wiring diagrams, printed circuit boards
TOOLS: 2-D layouts, variable-width polylines, text data export, component libraries, links to circuit analysis programs

USER: *Mechanical and manufacturing engineers*
JOBS: Machine design
TOOLS: 3-D surface and solid modeling features, links to motion analysis programs

No one gives you more

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At Compaq, we believe a notebook PC should deliver all the performance you need. No matter where you need it. That's the idea behind the COMPAQ LTE 386s/20 Personal Computer and its unique desktop expansion base.

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nside *and* outside the office.

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devices, including 3½" or 5¼" diskette drives. Even tape or CD-ROM drives. No other notebook and expansion base offers a more complete solution. With our new, more affordable prices, there has never been a better time to see your dealer.

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For a free brochure, call 1-800-231-0900, Operator 168. In Canada, 1-800-263-5868, Operator 168.

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COMPAQ

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2-D OR NOT 2-D: 35 DESIGN PACKAGES UNDER $2000

		STANDARD FEATURES				DRAFTING TOOLS					3-D MODELING TOOLS
Manufacturer	Product	Price	MB of EMS/XMS required	Requires math co-processor	Disk space required	2-D tools[1]	Number of snap-to options	Undo	Maximum windows	Maximum layers	Wireframe
AUTODESK	AutoCAD[3,4]	$3500	4	Y	9MB	all	10	Y	16	32,768	Y
ABBOT, FOSTER & HAUSERMAN	3-D MiniCAD	$99	0	N	4MB	P,M,S,B	1	Y	4	256	Y
AMERICAN SMALL BUSINESS COMPUTERS	DesignCAD 2D	$349	0	N	2.5MB	E,P,M,S	33	N	6	62	Y
ASHLAR	Ashlar Vellum W	$1995	4	Y	5MB	all	11	Y	[5]	256	N
AUTODESK	AutoSketch	$249	0	N[6]	2.5MB	E,P,S	10	Y	1	10	N
CADKEY	CADkey Light	$395	0	N	3.5MB	E,P,M	1	N	4	256	Y
	DataCAD 128	$349	0	Y	4MB	all	8	Y	1	1000	Y
COMPUTERVISION	DesignView	$895	0[7]	N	2MB	B,M,P,S	0	Y	[5]	20	N
	VersaCAD Drafter	$595	0	Y	5MB	E,B	1	Y	1	20	Y
CSE	Micro Solids Lite	$495	0	N	2MB	E,P,M,B	3	N	1	255	Y
DITEK INT'L	DynaCADD	$995	1	N	1.5MB	E,S,B	9	Y	4	256	Y
DYNAWARE USA	DynaPerspective DOS 2.0	$995	2	N	1.5MB	none	2	N	4	16	Y
ELCOMP PTY.	Drafteasy	$199	0	N	1.5MB	E,P,M	1	Y	1	4	Y
EVOLUTION COMPUTING	EasyCAD 2	$199	0	N[6]	570K	E,M,S	7	Y	1	256	N
	FastCAD	$795	0	Y	570K	E,P,M,S	13	Y	8	256	N
FORESIGHT RESOURCES	Drafix Windows CAD W	$695	2	N	2	all	●6	Y	4	256	N
GENERIC SOFTWARE	Generic CADD 5.0	$495	0	N[6]	2MB	E,M,S,B	11	Y	1	256	N
	Generic 3D	$349	0	N[6]	4MB	M,B	5	N	1	256	Y
	GenCADD	$990	0	N[6]	4MB	E,M,S,B	11	Y	1	256	N
	Architectural GenCADD	$990	0	N[6]	4MB	E,M,S,B	11	Y	1	256	N
	COGO										
IBM	IBM CAD	$1130	0	Y	10MB	all	1	N	1	[5]	N
	IBM CAD Plus	$1705	0	Y	10MB	all	1	N	1	[5]	N
IMSI	TurboCAD rel. 2	$150	0	N	1.5MB	E,P,M	9	N	1	128	N
KERN INT'L	Designer 3-D	$140	0	N	20K	E,P,M,S	0	Y	1	5	Y
MCAE TECHNOLOGIES	Cedar 1.09 W	$295	0	N	350K	P,M	4	Y	[5]	1	N
MEGA CADD	MegaModel/286	$1195	0	N	800K	none	1	Y	4	55	Y
	MegaModel/386	$1495	2	Y	1MB	none	1	Y	4	55	Y
MICROGRAFX	Designer W	$695	0	N[6]	2MB	all	1	Y	1	64	N
MOUSE SYSTEMS	CAD One	$80	0	N	3MB	all	4	Y	1	16	N
POINT LINE GRAPHICS	Point Line Drafter	$299	0	N	6MB	E,P,M,B	5	N	4	8	Y
ROBO SYSTEMS INT'L	RoboDraft	$695	0	N	2MB	none	1	N	1	256	N
	RoboCAD 4	$1995	0	N	2MB	E,M,S,B	3	Y	1	256	N
SAYIT	LaserCAD Professional	$70	0	N	1.25MB	E,P,M,B	5	N	1	47	N
SCHROFF DEVELOPMENT	SilverScreen	$495	0	Y	3MB	all	10	Y	[5]	1	Y
SHAMROCK SYSTEMS	Advanced Shamrock CAD	$495	0	N	1.5MB	all	4	N	1	16	N
	Professional Shamrock CAD	$1295	0	N	1.5MB	all	4	N	1	16	N

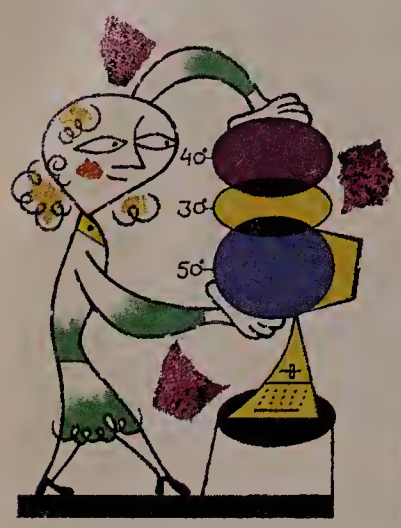
W Windows product.
[1] E = ellipses, B = Bézier curves, M = multipoint curves, P = polylines, S = spline curves.
[2] BL = block libraries, F = fonts, H = hatch patterns, L = lines.
[3] 1990 and 1991 World Class Award winner.
[4] Included in table for comparison purposes only.
[5] Unlimited.
[6] Recommended.
[7] 2MB to 4MB recommended.

			CUSTOMIZATION							COMPATIBILITY			
Surface modeling	Complex irregular surfaces	Solids modeling	User macros	Programming language interface	User-defined drawing elements[2]	Constraint management	Dimension driven	Dimension support: Associative	Dimension support: Ordinate	DFX and IGES import/ export	External file support	Text data export	Reader service number
Y	Y	Y	Y	Y	all	Y	Y	Y	Y	Y	Y	Y	702
Y	Y	N	Y	N	BL,F	Y	N	N	N	N	N	N	703
Y	Y	Y	Y	Y	BL,F,H	Y	N	Y	Y	Y	Y	Y	704
N	N	N	N	N	BL	Y	Y	Y	N	Y	Y	N	705
N	N	N	Y	N	all	Y	N	Y	N	DXF only	N	N	706
N	N	N	N	N	BL,F,L	N	N	N	N	N	N	N	707
Y	N	N	Y	Y	all	Y	N	Y	N	DXF only	N	Y	707
N	N	N	N	N	F,H,L	Y	Y	Y	Y	Y	Y	Y	708
N	N	N	Y	Y	all	N	Y	Y	N	Y	N	Y	708
Y	Y	Y	N	N	H	Y	N	N	N	DXF only	N	N	709
N	N	N	N	N	all	N	N	N	N	DXF only	N	N	710
Y	N	N	N	N	BL,L	N	N	N	N	DXF only	N	N	711
N	N	N	N	Y	BL,H	N	N	Y	Y	DXF only	Y	N	712
N	N	N	Y	N	all	Y	N	Y	Y	DXF only	N	N	713
N	N	N	Y	Y	all	Y	N	Y	Y	DXF only	N	N	713
N	N	N	Y	Y	BL,L	N	Y	Y	Y	Y	Y	Y	714
N	N	N	Y	N	BL,F,H	N	N	Y	N	N	N	Y	715
Y	N	N	N	N	BL,L	N	N	N	N	N	N	N	715
N	N	N	Y	N	BL,F,H	N	N	Y	N	N	N	Y	715
N	N	N	Y	N	BL,F,H	N	N	Y	N	N	N	Y	715
N	N	N	Y	Y	all	Y	Y	Y	Y	DXF only	Y	Y	716
N	N	N	Y	Y	all	Y	Y	Y	Y	Y	Y	Y	716
N	N	N	Y	Y	F,L	Y	N	Y	N	DXF only	Y	Y	717
N	N	N	N	Y	L	Y	Y	N	N	DXF only	N	Y	718
N	N	Y	N	N	none	Y	Y	Y	Y	DXF only	N	N	719
Y	Y	Y	Y	N	F,L	N	N	N	N	DXF only	Y	Y	720
Y	Y	Y	Y	N	F,L	N	N	N	N	DXF only	Y	Y	720
N	N	N	N	N	H	N	N	Y	N	DXF only	Y	N	721
N	N	N	N	N	L	Y	Y	N	N	DXF only	N	N	722
Y	Y	N	Y	Y	F,H	N	N	Y	N	DXF only	Y	Y	723
N	N	Y	N	N	none	N	N	N	N	N	N	N	724
N	N	N	N	N	none	N	N	N	N	Y	N	N	724
N	N	N	N	N	BL,F,H	N	N	N	Y	DXF only	N	Y	727
Y	Y	Y	Y	N	BL,F,H	Y	N	Y	Y	DXF only	N	Y	725
N	N	N	Y	Y	BL,F	N	N	N	N	DXF only	Y	Y	726
N	N	N	Y	Y	BL,F	N	N	N	N	DXF only	Y	Y	726

For more information about all products in this table, circle reader service no. 905.

(continued from p. 215)
revise your drawings often, look for a dimension-driven program that lets you change the design by plugging in new values instead of manipulating objects on screen.

A dozen international standards specify the way objects are dimensioned. Make sure the CAD program you buy supports or can be customized to match the dimension standards you need. Also, look for CAD packages with associative dimensioning. This feature automatically updates dimensions when you change your design.



COMPATIBILITY

Eventually you'll need to print or plot the drawing or export the file to another program. Almost all CAD programs can handle DXF files, so you can mock up simple designs in a low-cost package before exporting them to a more powerful program. Mainframe-based CAD packages are more likely to use the initial graphics exchange specification (IGES) as their exchange format. If you want your program to respond automatically to design changes dictated by another program, such as a data base or spreadsheet, look for a package that offers external file support.

The ability to export textual data can be equally important. Many programs allow you to attach numbers and text to a file—for example, a drawing of a toggle switch may contain the manufacturer name, model number, and voltage rating. This data can then be exported to other programs for cost estimates or for manufacturing.

CAD AS CAD CAN

CAD isn't just for architects and engineers. The low-end to midrange products described here give you plenty of design power and precision for a relatively low price.

Ralph Grabowski is the author of four books on AutoCAD *and is a freelance writer and consultant living in Abbotsford, British Columbia, Canada. Nina Zottoli is a freelance writer based in San Diego.*

WHERE TO BUY

Abbot, Foster & Hauserman Co.
E. 111 Lincoln Rd. #2
Spokane, WA 99208
800/562-0025,
509/489-9121 (fax)

American Small Business Computers, Inc.
One American Way
Pryor, OK 74361
918/825-4844,
918/825-6359 (fax)

Ashlar Inc.
1290 Oakmead Pkwy. #218
Sunnyvale, CA 94086
408/746-1800,
408/746-0749 (fax)

Autodesk, Inc.
2320 Marinship Way
Sausalito, CA 94965
800/445-5415

Cadkey, Inc.
4 Griffin Rd. N
Windsor, CT 06095
800/654-3413,
203/298-6401 (fax)

Computervision, a Prime Company
100 Crosby Dr.
Bedford, MA 01730
800/248-7728,
617/868-4658 (fax)

CSE Corp.
600 Seco Rd.
Monroeville, PA 15146
412/856-9200,
412/856-9203 (fax)

Ditek Int'l
2651 John St. #3
Markham, Ontario
L3R 2W5 Canada
416/479-1990,
416/479-1882 (fax)

Dynaware USA, Inc.
950 Tower Ln. #1150
Foster City, CA 94404
800/445-3962,
415/349-5879 (fax)

Elcomp Pty. Ltd.
Computers Etc.
4600 Chippewa Bldg. N #204
St. Louis, MO 63116
314/351-2513,
314/351-7258 (fax)

Evolution Computing
437 S. 48th St. #106
Tempe, AZ 85281
800/874-4028,
602/967-8633 (fax)

Foresight Resources Corp.
10725 Ambassador Dr.
Kansas City, MO 64153
800/231-8574,
816/891-8018 (fax)

Generic Software, Inc.
11911 Northcreek Pkwy. S
Bothell, WA 98011
800/228-3601,
206/483-6969 (fax)

IBM
CADAM Inc.
1935 N. Buena Vista Blvd.
Burbank, CA 91504
800/442-6223,
203/783-5087 (fax)

International Microcomputer Software Inc. (IMSI)
1938 Fourth St.
San Rafael, CA 94901
800/833-4674,
415/454-8901 (fax)

Kern Int'l
190 Duck Hill Rd.
Duxbury, MA 02332
617/934-2452

MCAE Technologies, Inc.
3160 De La Cruz Blvd. #201
Santa Clara, CA 95054
800/258-6223,
408/748-1915 (fax)

Mega Cadd, Inc.
65 Marion St. #301
Seattle, WA 98104
800/223-3175,
206/623-5721 (fax)

Micrografx
1303 E. Arapaho Rd.
Richardson, TX 75081
800/733-3729,
214/234-2410 (fax)

Mouse Systems Corp.
47505 Seabridge Dr.
Fremont, CA 94538
415/656-1117,
415/656-4409

Point Line Graphics
8383 Greenway Blvd.
Middleton, WI 53562
800/447-6468,
608/831-0087 (fax)

Robo Systems Int'l
105 Terry Dr.
Newtown, PA 18940
800/221-7626,
215/860-6993 (fax)

Sayit Inc.
P.O. Box 672
Orem, UT 84059
800/225-2780

Schroff Development Corp.
P.O. Box 1334
Mission, KS 66222
913/262-2664,
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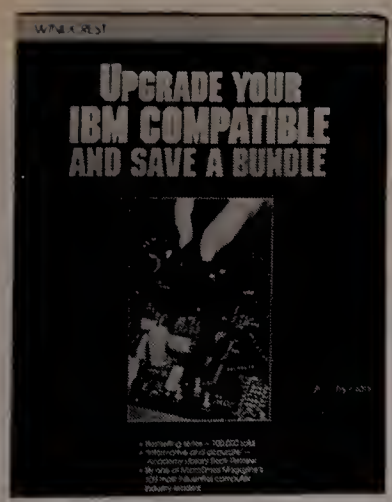

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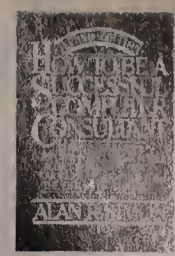

9339 $29.95
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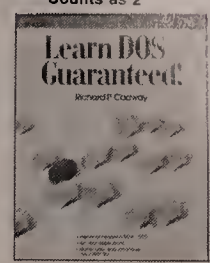
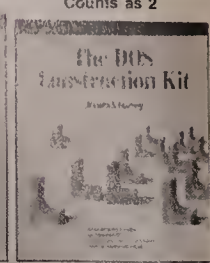
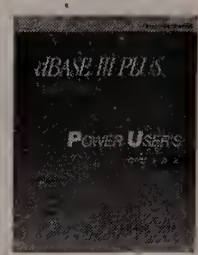


3331P $14.95



3563P $22.95



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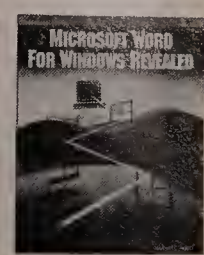

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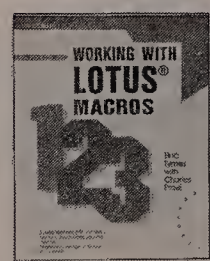

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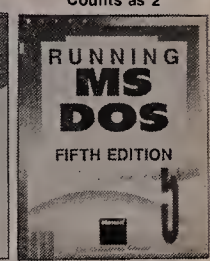

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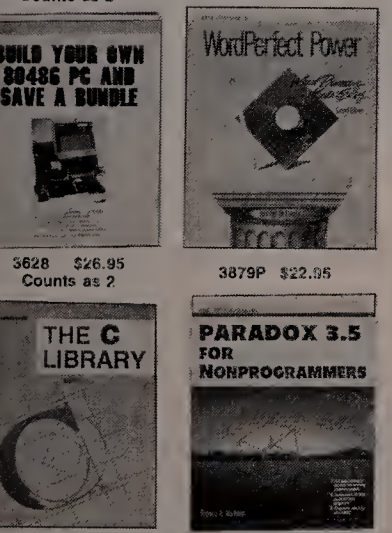

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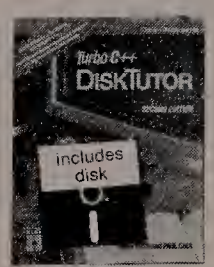

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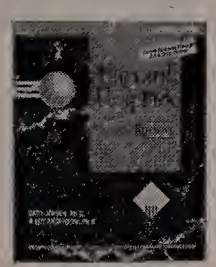

881621-1P $27.95
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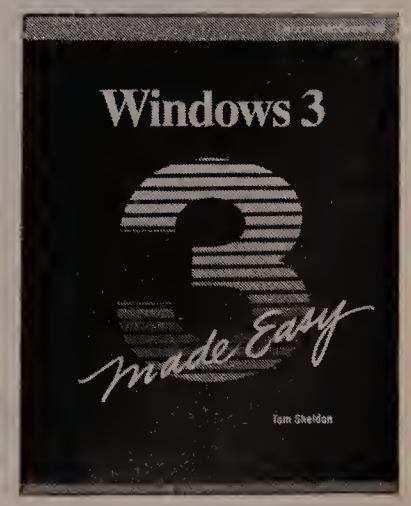

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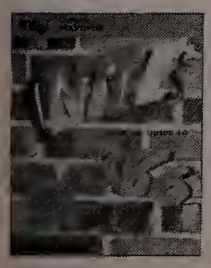
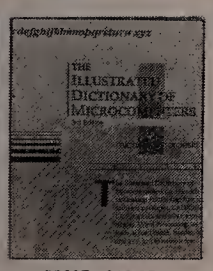


881693-9P $29.95



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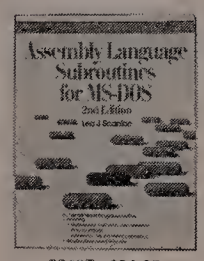

3649P $24.95
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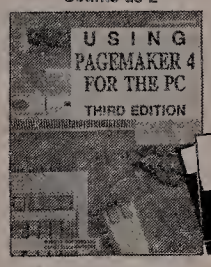

881629-7 $26.95
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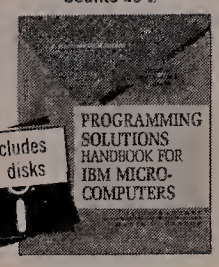

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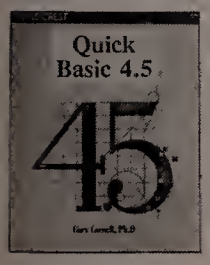

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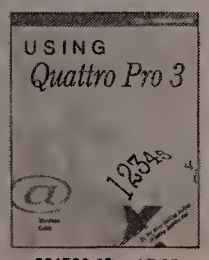

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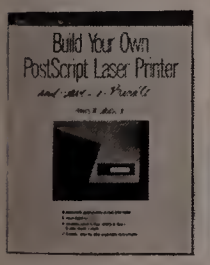

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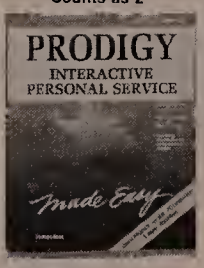
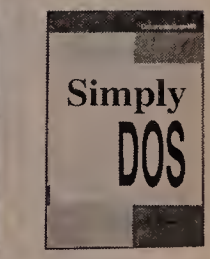
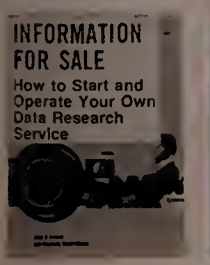


881708-0P $19.95

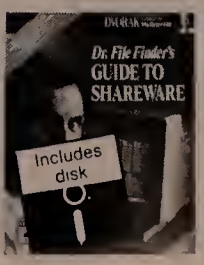


881715-3P $14.95

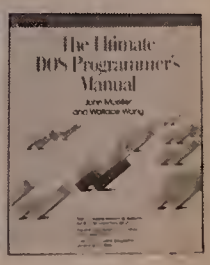


3057P $15.95

9309P $28.95
Counts as 2



15057P $39.95
Counts as 2



3534P $27.95
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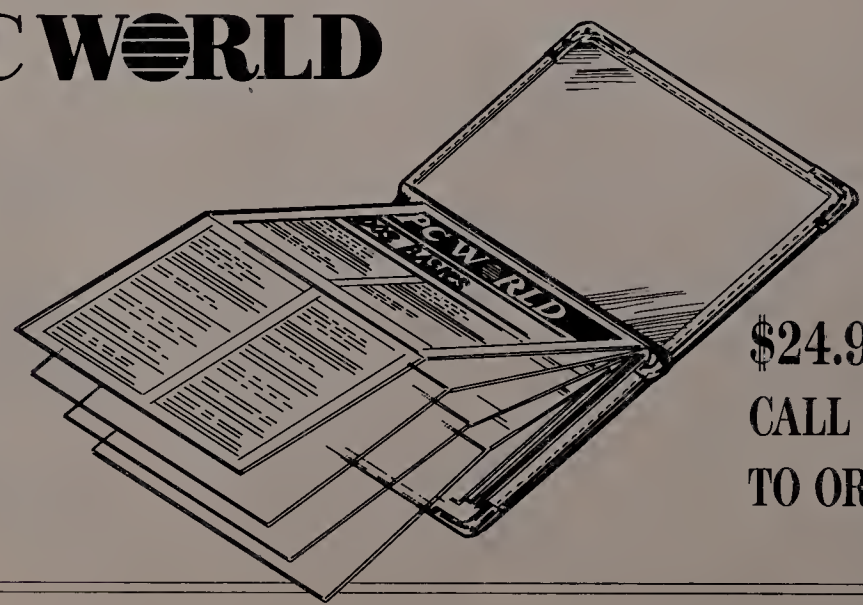

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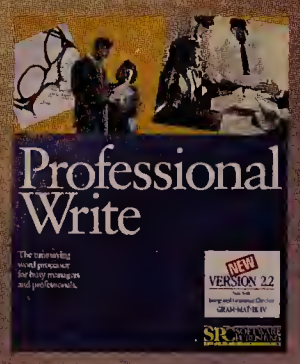

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Readers Warm to Quattro Pro

Quattro Pro is coming on strong, but Lotus holds its own with two flavors of 1-2-3.

Roberta Furger

Time was when you could safely assume that if someone was using a PC spreadsheet, it was *1-2-3*. Not so any longer, however.

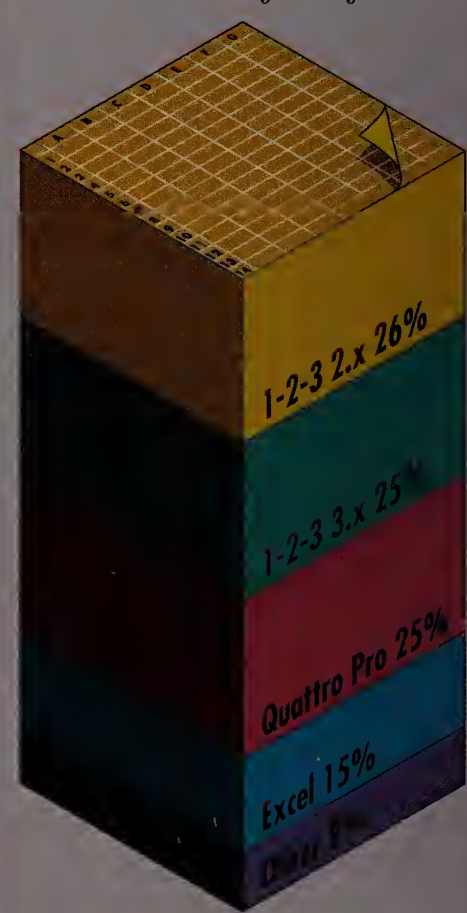
Sure, Lotus's world-famous spreadsheet is still the most widely used number cruncher (if you add up the users of all available versions), but for a growing number of users, *1-2-3* is no longer the spreadsheet of choice.

Borland's turbocharged *Quattro Pro* represents *1-2-3*'s stiffest competition, according to a June 1991 survey of 250 *PC World* readers. One-quarter of the respondents use *Quattro Pro*, with nearly one-third of this group having purchased the program in the last 18 months. Borland's aggressive pricing scheme—$129.95 and a *1-2-3* disk gets you a full-blown copy of *Quattro Pro*—together with the program's full compatibility with *1-2-3* version 2.2 have doubtless proved an attractive combination for many former *1-2-3* devotees.

Although Microsoft's entry, *Excel*, has won more than its share of praise for its elegant interface and ease of use (see the review "Spreadsheets: Beyond Number Crunching" in our September 1991 issue), the *PC World* Best Buy ranks fourth in installed base among

QUATTRO PRO CHALLENGES 1-2-3's DOMINANCE

Installed base among surveyed users



JAVIER ROMERO

SATISFACTION LEVEL HIGH AMONG SPREADSHEET USERS

Overall satisfaction with product, 5=high 1=low

PERFORMANCE, EASE OF USE MOST IMPORTANT

Users rank important buying criteria, 5=high 1=low

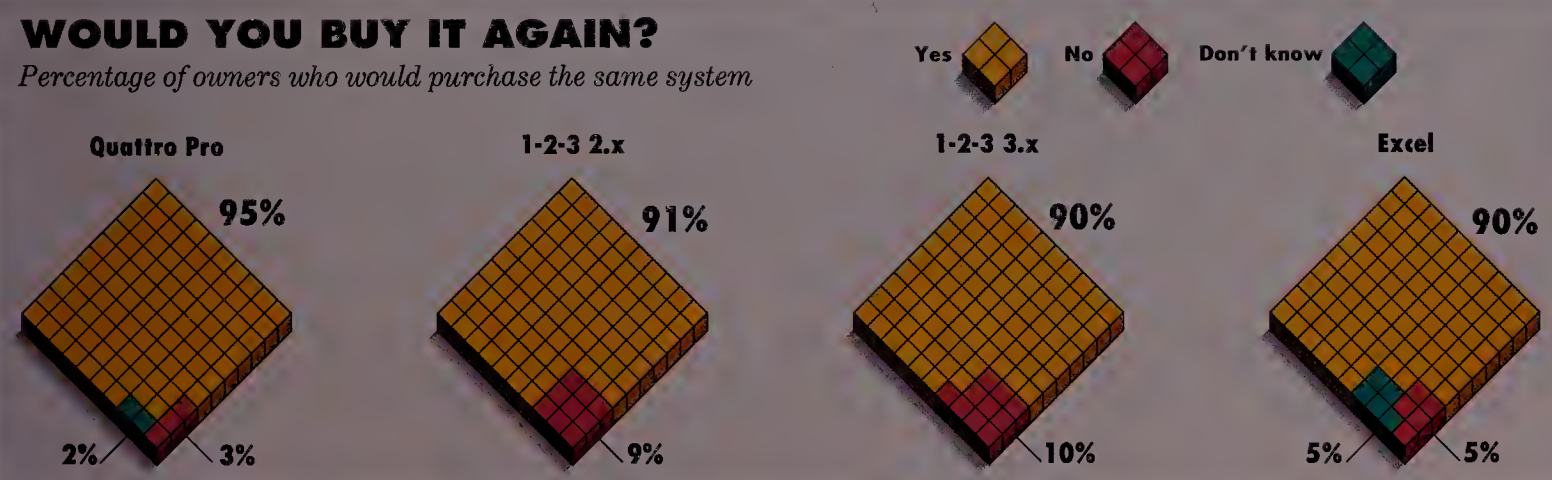
CRITICAL FEATURES EARN HIGH MARKS

Satisfaction with key features, 5=high 1=low

	Overall	1-2-3 2.x	1-2-3 3.x	Excel	Quattro Pro
Analytic capabilities	4.2	4.1	3.9	4.5	4.4
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Performance	4.1	4	4	4.2	4.3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Programmability	3.9	3.8	3.8	4	4
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

WOULD YOU BUY IT AGAIN?

Percentage of owners who would purchase the same system



Source: Data is based on a June 1991 random survey of 250 PC World subscribers who bought a spreadsheet in the last 18 months, and it accurately represents this group as a whole. Use caution in drawing conclusions from data reflecting the opinions of only a few individuals.

our surveyed users.

The overwhelming majority of users we spoke to are still satisfied with their choice of spreadsheets and would purchase or upgrade to the same package again. We'll see what happens next year when we do a survey on the next generation of graphical spreadsheets, including *Windows*-based versions of *1-2-3* and *Quattro Pro.*

Roberta Furger is an associate editor for PC World.

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The CompuAdd 325 and Dell System 320LT were the most aggressively priced desktop and portable PCs in the latest survey by International Data Corporation.

BARGAINS OF THE MONTH

Best-Sellers

Leading PCs sold through traditional computer channels

1. *IBM PS/2 Model 55 SX*
2. *IBM PS/2 Model 70 (20 MHz)*
3. *Compaq LTE 386s/20*
4. *IBM PS/2 Model 30-286*
5. *Compaq Deskpro 386s*
6. *Compaq Deskpro 386n*
7. *Compaq 386/20e*
8. *Compaq Deskpro 386s/20*
9. *NEC PowerMate SX*
10. *IBM PS/2 Model 50 Z*

Despite IBM's launch of other 386SX-based PCs, the PS/2 Model 55 SX still easily led sales through dealers in Storeboard/Computer Intelligence's latest survey.

Over the Counter

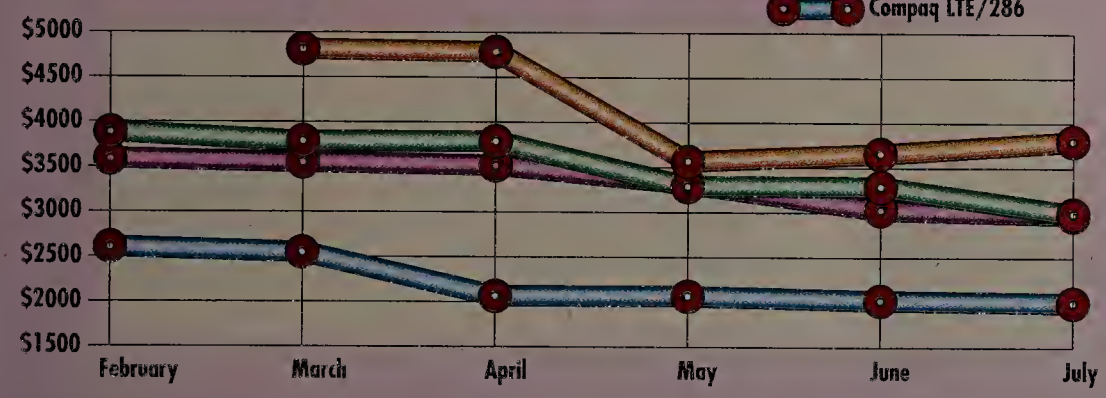
What you pay at retail stores for popular PCs

	Configuration				National					
	Speed (MHz)	RAM (MB)	Hard disk (MB)	Video adapter	List	Average	Low	Boston	Chicago	Dallas/Ft. Worth
80386SX-based desktop PCs										
AST Bravo 386SX/20	20	2	40	VGA	$2395	$1880	$1485	$1904	$1916	$1786
Compaq Deskpro 386s	16	2	40	VGA	$2299	$1839	$1379	$1847	$1875	$1937
Compaq Deskpro 386s/20	20	2	60	VGA	$2599	$2091	$1559	$2079	$2120	$2128
Dell System 320 SX	20	2	40	VGA	$1700	$1700	$1700	$1700	$1700	$1700
Epson Equity 386SX/20 Plus	16	2	40	VGA	$3449	$2527	$1837	$2854	$2449	$2455
IBM PS/2 Model 35 SX-043	20	2	40	VGA	$2525	$1952	$1667	$2038	$1986	$1812
NEC PowerMate SX/20	20	2	42	none	$2799	$1948	$1185	$2065	$2169	$1847
80386DX-based desktop PCs										
AST Premium 386/25	25	2	110	VGA	$5595	$4265	$3099	$4378	$4132	$3961
Compaq Deskpro 386/33L	33	4	120	VGA	$6199	$4937	$3719	$4959	$5107	$5012
CompuAdd 325	25	4	120	VGA	$2590	$2590	$2590	$2590	$2590	$2590
Dell System 333P	33	4	100	VGA	$3000	$3000	$3000	$3000	$3000	$3000
Epson Equity 386/25 Plus	25	2	100	VGA	$4749	$3510	$2849	$3894	$3360	$3313
IBM PS/2 Model 70-A16	25	4	160	VGA	$6445	$4935	$4237	$5220	$5016	$4625
Tandy 4033 LX	33	2	105	VGA	$5898	$5898	$5898	$5898	$5898	$5898
80486SX-based desktop PCs										
ALR BusinessVEISA	20	5	120	n/a	$4295	$3356	$3007	$3548	$3196	$3204
AST Premium II 486SX/20	20	4	80	VGA	$3495	$2739	$2167	$2735	$2796	$2608
IBM PS/2 Model 90XP-OG5	20	4	80	XGA	$8345	$6773	$5678	$7164	$6937	$6347
80486DX-based desktop PCs										
AST Premium 486/25E	25	4	110	VGA	$8595	$6554	$4700	$6726	$6876	$6022
Compaq Deskpro 486/33L	33	4	120	VGA	$8999	$7178	$5399	$7199	$7340	$7276
IBM PS/2 Model 95 XP	33	4	320	XGA	$16,445	$12,567	$10,854	$13,320	$12,898	$11,600
NEC PowerMate 486/25E	25	4	140	none	$9899	$7169	$4950	$7305	$7672	$6683
Portables/laptops										
Compaq LTE/286	12	640K	20	CGA-LCD	$2499	$2000	$1499	$1999	$2038	$2020
Compaq LTE 386s/20	20	2	30	VGA-LCD	$4399	$3812	$2939	$3888	$3996	$3721
Dell System 320LT	20	2	40	VGA-LCD	$2999	$2999	$2999	$2999	$2999	$2999
Epson Equity LT-386SX	16	2	40	VGA-LCD	$3998	$2990	$2319	$3278	$2943	$2997
IBM PS/2 Model L40 SX	20	2	60	VGA-LCD	$5995	$4573	$3957	$4856	$4745	$4302
NEC Ultralite 286F	12	1	20	CGA-LCD	$2799	$1997	$1400	$2065	$2169	$1900
Toshiba T1200XE	12	1	20	CGA-LCD	$2299	$1803	$1494	$1816	$1888	$1871
Toshiba T2000SX	16	1	40	VGA-LCD	$3749	$2935	$2437	$3031	$3076	$2929
Zeos Notebook 286	12	1	20	VGA-LCD	$1995	$1995	$1995	$1995	$1995	$1995

From an IDC survey of more than 180 computer dealers in eight metropolitan areas. Figures based on at least four price quotes for each machine. Prices are based on manufacturer's standard configuration without monitor.

Trend Line: Portable Prices Lighten Up

National average street price for selected portable PCs over six months



Portable PCs have been under the same pricing pressures as desktop PCs, and their costs have dropped just as substantially. Vendors began drastically cutting prices this spring and continued through summer. However, Compaq's best-selling LTE 386s/20 has rebounded slightly.

A wave of 386SX notebook PC debuts this fall should affect prices of 286 PCs and heavier laptops.

Metropolitan

Los Angeles	Miami/ Ft. Lauderdale	New York	San Francisco Bay Area	Washington, D.C.
$1872	$1976	$1892	$1916	$1739
$1767	$1849	$1856	$1824	$1755
$2009	$2123	$2125	$2210	$2018
$1700	$1700	$1700	$1700	$1700
$2417	$2529	$2391	$2538	$2660
$1885	$2067	$1926	$2020	$1985
$2118	$2127	$1823	$2211	$1561

$4099	$4616	$4420	$4454	$3836
$4740	$4943	$4939	$4962	$4835
$2590	$2590	$2590	$2590	$2590
$3000	$3000	$3000	$3000	$3000
$3474	$3740	$3349	$3416	$3579
$4810	$5110	$4866	$5156	$5066
$5898	$5898	$5898	$5898	$5898

$3061	$3462	$3453	$3379	$3407
$2726	$2884	$2761	$2866	$2576
$6601	$6941	$6723	$7076	$6952

$6528	$7091	$6790	$6618	$5542
$6898	$7287	$7232	$7132	$7019
$12,272	$12,844	$12,113	$13,238	$12,926
$7490	$7523	$7721	$7820	$5883

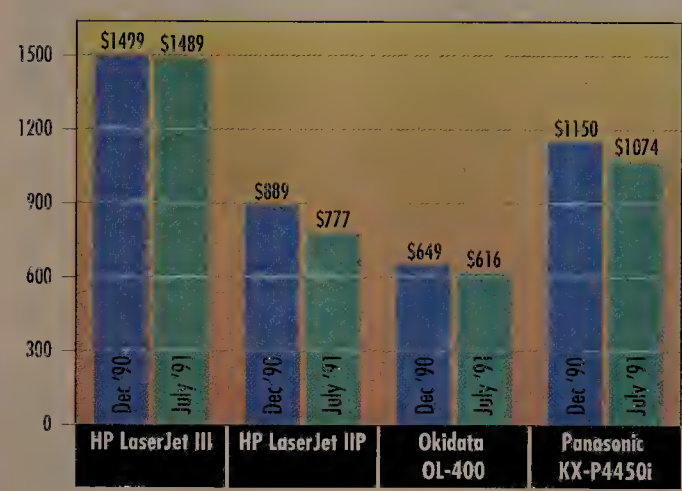
$2047	$1992	$1961	$2003	$1931
$3698	$3821	$3807	$3737	$3717
$2999	$2999	$2999	$2999	$2999
$2888	$3149	$2739	$2932	$3032
$4474	$4712	$4357	$4661	$4712
$2013	$2127	$2009	$2211	$1712
$1747	$1805	$1766	$1824	$1742
$2777	$2943	$2969	$2917	$2879
$1995	$1995	$1995	$1995	$1995

PC Futures: Slip-Sliding Away

CompuAdd's 325 is the desktop Bargain of the Month[1], while Dell's System 320LT repeats as portable Bargain of the Month. IBM's PS/2 Model 55 SX maintains control of the best-seller list, which remains dominated by 20-MHz systems. Overall, customers enjoyed plenty of bargains as pricing continued to slip in every major PC category. Vendors that fought the trend have suffered—for example, Compaq's sales and revenues decreased in the first half of 1991, while AST and Dell had record results. Intel and AMD are taking off the gloves for a CPU chip war that will further erode system prices. Unlike PC sales, the laser printer market is dominated by one vendor: Hewlett-Packard. But similarly relentless competition has brought entry-level lasers down under $1000, where they often win the street battle against dot matrix models.

Laser Prices: Getting Low-Down

Best street prices in dollars



Fierce competition in LaserJet-compatible laser printer sales continues to push down prices. As in the PC market, manufacturers generally plan to upgrade performance and features rather than watch prices (and profit margins) drop even further.

Source: BIS

[1] Bargains of the Month are determined by adjusting prices on PCs of a given class for standard memory and storage, then finding which PC campares best.

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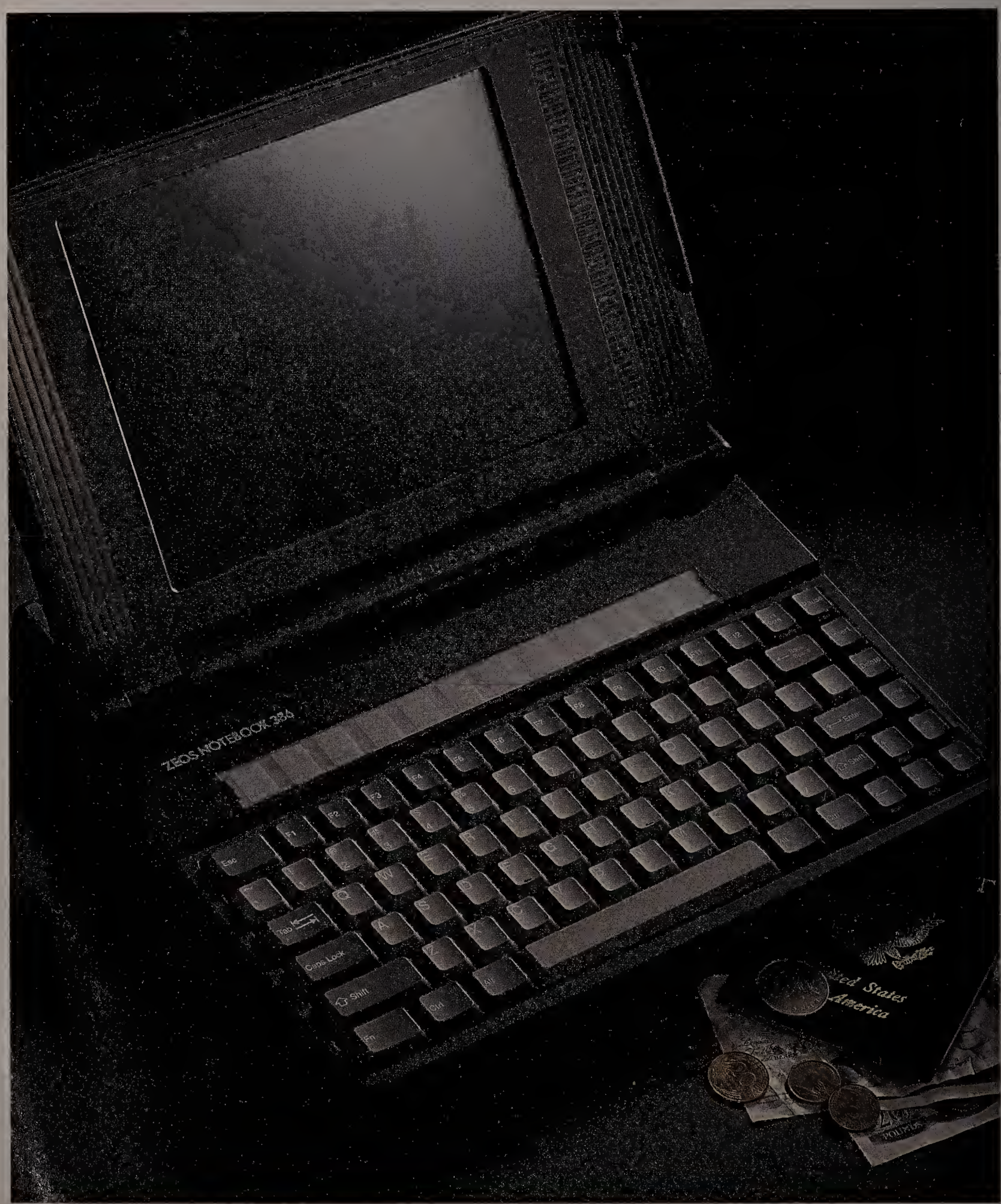

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Spreadsheets

PC World's expert crew of road testers gives thumbs up to today's features-packed spreadsheets, but long for the days of speedier performance.

Alice LaPlante

Spreadsheets aren't just for number-crunching anymore. They offer a level of functionality that the creators of *Visicalc* could never have imagined.

From the reaction of our road testers, the hottest thing in spreadsheets today is WYSIWYG graphics, rather than more traditional analytic or data management tools. All of our road testers are enjoying the benefits of the new presentation features included in each of the packages evaluated here: *Excel 3.0, 1-2-3* release 3.1, and *Quattro Pro 3.0.* Most even seem to have a bit of *fun* exploring the brave new world of graphics.

But all those features come at a price, and for most users that price is performance. Users of the three spreadsheets featured here lamented the sometimes sluggish performance that has accompanied the programs' ever-burgeoning feature sets. Even *Quattro Pro 3.0,* which earned a flawless four-star rating in our September review (see "Spreadsheets: Beyond Number Crunching") was considered slow by one of our road testers who uses a 25-MHz 386.

The versatility of today's leading spreadsheets may slow performance, but most road testers report that the packages are remarkably easy to use. All three spreadsheets earn more than passing grades in the ease-of-use category. Even *1-2-3* release 3.1, whose complex branching menus can confuse all but the most hard-core user, didn't rate lower than a B in this category.

Have today's spreadsheet users gone soft, overwhelmed by the cornucopia of features, or have software developers simply figured out what makes a good spreadsheet? You be the judge.

1-2-3 3.1

Tom Alcorn

Tom uses 1-2-3 *to do real-time analysis of crude oil prices and futures.*

1-2-3 is a very versatile product and suits us well in the wide range of accounting applications and economic models we routinely do.

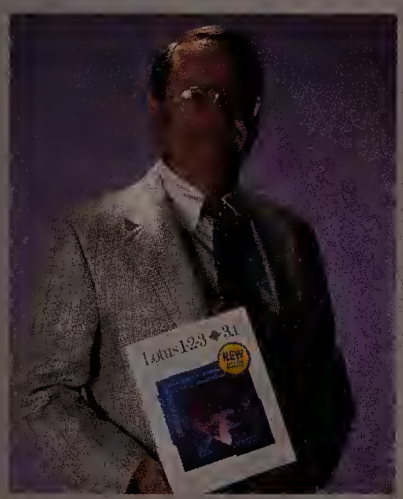
With 3.1, Lotus has made a quantum leap as far as data base functions and graphics capabilities are concerned. People like having a picture to look at, so the graphics are important to a spreadsheet program. Looking at a graphic is a quicker way of getting information than looking at numerical data in a worksheet.

There are some rough edges, though. Because this version is so complex, it's more difficult to use than earlier versions of *1-2-3.* They put a lot of features

JAVIER ROMERO

GALEN WAMPLER

Name: Tom Alcorn
Position: Vice president
Company: Advanced Trading Systems, a Houston, Texas, money-management and consulting firm
Hardware: 25-MHz 386, 2MB RAM, 100MB hard drive



MARK WILLIAMS

Name: Jerry Morgan
Position: Vice president and treasurer
Company: Centex Corp., a Dallas construction firm
Hardware: 25-MHz 386, 4MB RAM, 110MB hard drive

FRED MERTZ

Name: Kathy Vincent
Position: Financial analyst
Company: The CitiBank Private Bank, San Francisco
Hardware: 25-MHz 386, 4MB RAM, 80MB hard drive

in it, which is good, but it's steepened the learning curve. You also need a lot of horsepower when running 3.1.

We still use 2.01 for certain applications. It runs faster, and key add-ons, such as *3-2-1 Blastoff*, aren't available for 3.1. But 3.1 is great for the graphics. In fact, it's difficult to think of anything that would cause me to switch to another spreadsheet.

Jerry Morgan

Jerry uses 1-2-3 *for all his financial analysis, reporting, and budgeting work, as well as for most of his word processing needs, such as writing letters and memos.*

I was underwhelmed with release 3.0, so I was late getting started with 3.1. But once I saw what you could do with the WYSIWYG capabilities of 3.1, I was very anxious to get a copy. I've been very pleased with it from a graphics point of view.

I'm crazy about the print preview and the ability to automatically fit a spreadsheet onto a single page. I also like the live graphing capabilities.

But performance suffers with 3.1. In fact, because I don't need the multidimensional spreadsheet features in 3.1, I'm going to move to 2.3. It has the WYSIWYG features, but it runs much faster because it's still the assembly language version. A lot of spreadsheet users around my office have switched to *Quattro Pro*, but I feel that Lotus is completely adequate for my needs. Actually, whatever spreadsheet you use, I think it boils down to what you are comfortable with. And I'm very comfortable with *1-2-3*.

EXCEL 3.0

Joey Gurango

Joey Gurango is a senior consultant with Match Data Systems of Bellevue, Washington. He works on a 25-MHz 386 PC with 4MB of RAM and an 80MB hard drive. Joey uses Excel *to track and manage costs for clients' development projects.*

Excel is a very intuitive product. I cut my teeth on *1-2-3* and *Visicalc*, and it was never obvious how to do things. You always had to go to the manual. With *Excel* you can be either a casual or experienced user, and you'll rarely have to look at the manuals.

The one exception is using *Excel*'s graphics. Because they are so complex, they're much less intuitive than the rest of the program. For example, there's simply no easy way to create the new 3-D graphs. I have to go to the manuals to understand a lot of the newer graphical features.

Performance is also a problem. Excel runs okay on my 25-MHz 386, but on anything less, it would be too slow. Microsoft really needs to work on performance.

Kathy Vincent

Kathy uses Excel *to do monthly and quarterly reporting as well as routine number crunching.*

I originally switched to *Excel* for the font support, which *1-2-3* didn't have when *Excel* first came out on the PC. Once I've finished with my number crunching, I need presentation quality output. Since switching, I've never been tempted to look back.

The graphics get better with each new release of *Excel*. Before, I used *Harvard Graphics* for certain charts because I liked the 3-D effect you could get. With *Excel* version 3.0 you don't have to go to a separate graphics package.

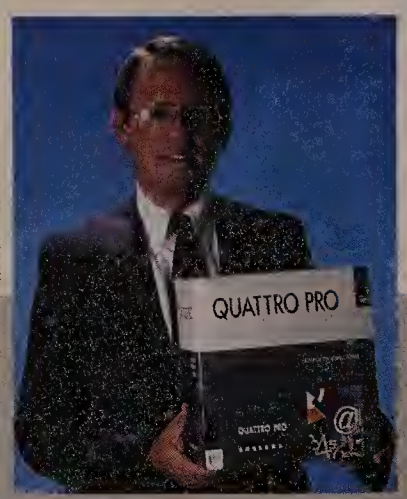
I also like *Excel*'s linking capabilities. If I change a number in one spreadsheet, the 20 or 30 other spreadsheets that reference that number automatically update themselves. In *1-2-3* I would have to make each change separately.

The macros are easy to use. I simply point and click, and tell the program to record my keystrokes. That's really handy.

I've noticed that the performance has slowed down a little with the latest re-

lease of *Excel*, though. I had a 16-MHz 386 machine, and had to switch to a 25-MHz one, because my spreadsheets are so number intensive.

Excel's data base feature isn't really helpful to us because it's so limited by available memory. You needed a data base function in a spreadsheet before DDE (Dynamic Data Exchange) but no longer—all you need is a *Windows* data base program, and you can automatically access any of the data stored in your spreadsheet from that data base, or vice versa.



MARK WILLIAMS

Name: Andy Barkley
Position: Vice president and controller
Company: Six Flags Corp., Arlington, Texas
Hardware: 10-MHz 286, (with *Quattro Pro* running on a Novell NetWare LAN)

GALEN WAMPLER

Name: Robert Laird
Position: Lead technical specialist
Company: Panhandle Eastern Corp., Houston, Texas
Hardware: 25-MHz 386, 8MB RAM, 300MB hard drive

QUATTRO PRO 3.0

Andy Barkley

Andy uses Quattro Pro 3.0 *for projections, budgeting, forecasting, and other types of financial analysis. He also uses it to create graphics and presentations for management meetings.*

I've been impressed and pleased with *Quattro Pro*. You can create great-looking documents easily and quickly; the graphing capabilities and the annotate features on the graphics are extremely useful.

Quattro Pro is versatile. I especially like the fact that all the functions are integrated into a single piece of software. I also like the ability to turn the recorder on before I start working. Then if there's a set of steps or sequences that I want to repeat, all I do is find that sequence, clip it out, and put it into a macro.

It could be a better performer, however. Version 3.0 has improved significantly, but printing, especially graphics, could be improved further.

Robert Laird

Robert oversees a 45-server wide-area network for a natural gas pipeline company. He uses Quattro Pro *to analyze the load carried by the network.*

Quattro Pro is great. I do a lot of presentations and overheads, so the graphics are a big plus.

Because I came from the Lotus world, I still use the Lotus-compatible menu, even though everyone else has switched to the *Quattro Pro* menu. It made the transition easy.

With the annotate feature, there is no reason to use any other graphics package. I even use *Quattro Pro* to create charts for use in other packages. The 3-D charts are especially useful.

As far as macros go, I really like the instant replay feature where you hit a set of keystrokes and can replay it over and over again. I also like the debugging capabilities of the macros, which made it easy to write a spreadsheet application. In fact, *Quattro Pro* is a sophisticated programming language in itself.

The only thing missing in *Quattro Pro* is a top-flight auditing capability that would allow me to set rules for equation generation, and not let me violate those rules when setting up complex spreadsheets. I'd also like a feature that would trace the connection between cells. It takes a lot of work to debug a complicated spreadsheet.

Alice LaPlante is a freelance writer in Palo Alto, California.

REPORT CARD

	1-2-3 3.1		Excel 3.0		Quattro Pro 3.0	
	Tom Alcorn	Jerry Morgan	Joey Gurango	Kathy Vincent	Andy Barkley	Robert Laird
Ease of use	B	B	A	B+	A	B
Decision support	B+	B	A	B	A	B
Presentation	B	B	B	B+	B	B+
Performance	C+	C	C+	C+	B	C+
Data management	C+	C	C	*	*	B
Programmability	B+	B	A	B	B	B+
Overall	B	B	B+	A-	A-	B+

*User did not use feature or test it fully.

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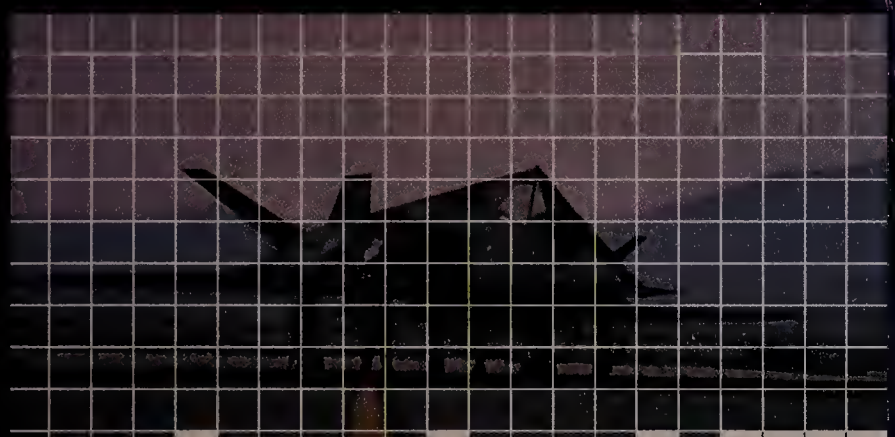
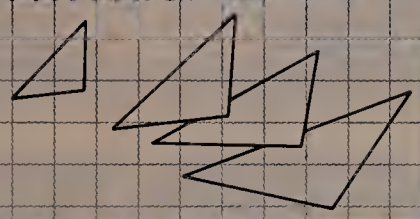


F-117A NIGHTHAWK



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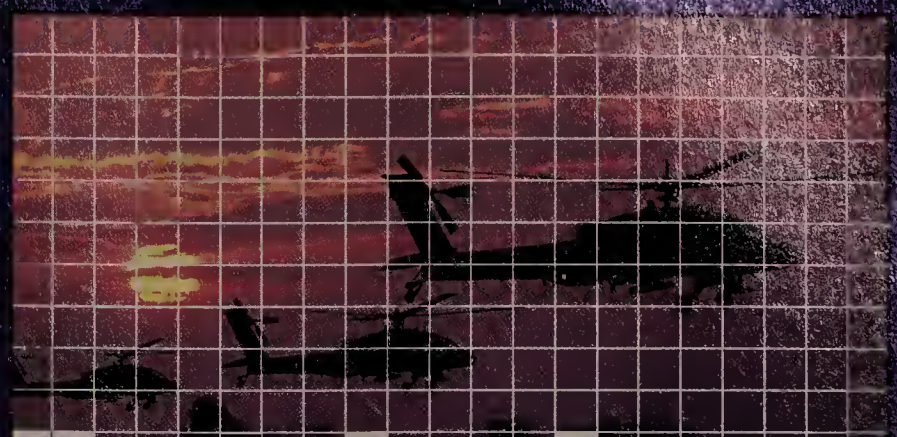
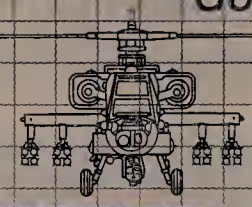


GUNSHIP 2000



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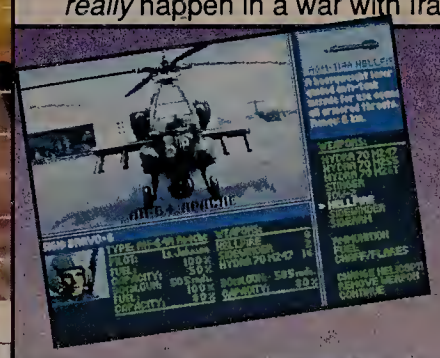

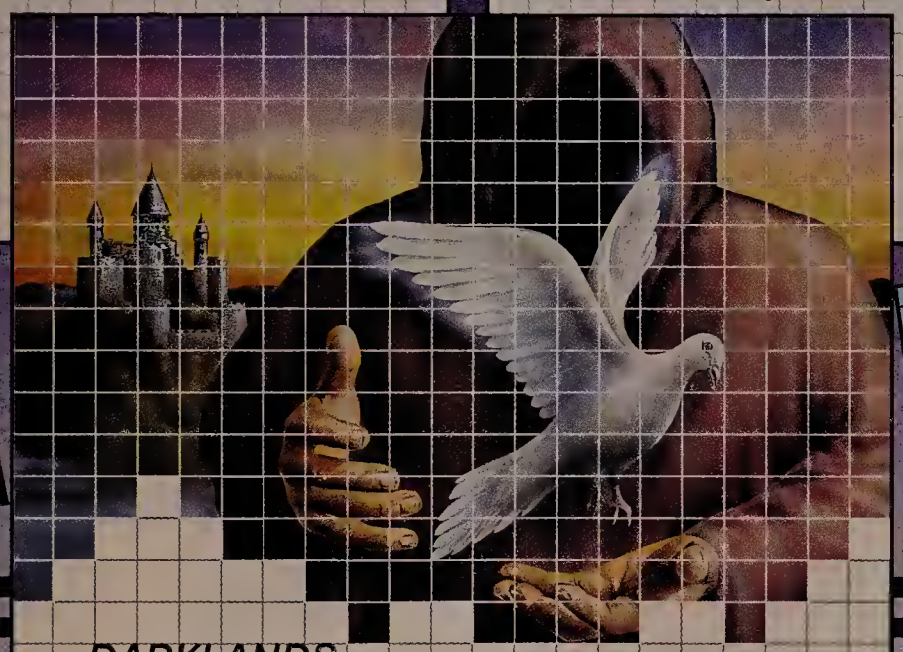

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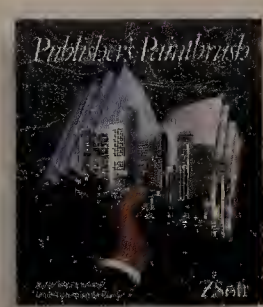

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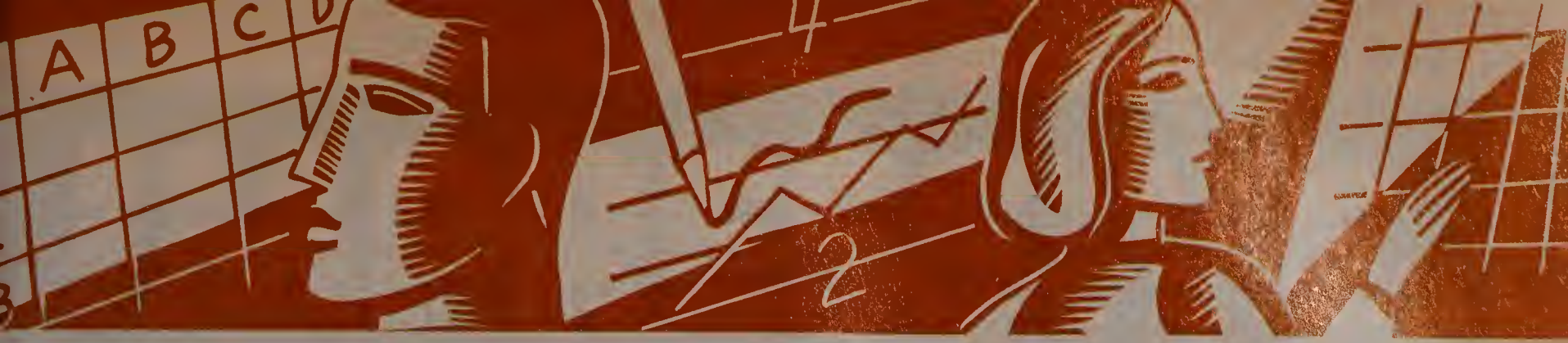

SPREADSHEETS (A..Z)

Practical tips for building better worksheets

Richard Scoville

Random numbers are the lifeblood of all statistical sampling procedures: Accountants use them to select transactions for audits; quality control engineers use them to select products for quality testing; scientists use them to design experiments. In this month's column, we'll show you the basic functions and formulas for generating random numbers; then we'll show off a macro that generates sets of nonrepeating random numbers.

@RAND

Suppose your company has recently instituted a just-in-time manufacturing process and you need to randomly select 25 of 500 newly arrived parts for quality inspection. First, you number each part, from 1 to 500. Then, you fire up your spreadsheet and check out the @ functions. You find that *1-2-3* provides a function, @RAND, that yields a 10-digit random number between 0 and 1. You scratch your head a moment, then enter this formula into cell A1: **@RAND*500**. The value 58.49203765 appears.

Looks promising, but it's got 8 superfluous decimal places. So you modify your formula to read **@INT(@RAND*500)**. No decimals, great! Now, using */Copy*, you make 25 copies of the formula. Voilà—25 random numbers! But no sooner have you congratulated yourself, you notice that one of the random values is 0, whereas you needed numbers starting with 1. Pressing **<F9>** to recalculate the worksheet shows that the values actually range from 0 to 99, not from 1 to 100. So you try again: You enter **@INT(@RAND*500+1)**, make 25 copies, print the sheet, and pick up your clipboard.

Then you notice that one of the part numbers appears in your sample three times, and two others appear twice. It's clear you don't want to inspect the same parts more than once. But time and patience are growing short, so you recalculate and print the worksheet again, mark out the duplicates in your original sample, fill in the gaps with the first few numbers from the new list, and proceed with your inspection.

Replacements, Anyone?

Simply copying a random number formula is equivalent to sampling *with re-*

(continues)

Spreadsheet Toolbox

Club MED

And while we're on the subject of macros, if you build yours in *1-2-3* release 2.x, you'll find Personics's *Macro Editor/Debugger*, (*MED* for short) to be just about the handiest gadget to come down the pike in a long time. This $199.95 add-in lets you view and edit your macros in a standard three-column (Labels, Macros, and Comments) layout at the bottom of your screen while your worksheet remains visible at the top. From the add-in's menu, you select the macro you want to work with, either by range name or by cell address. Then, *MED* lets you paste range names into your macro commands, insert or delete rows without disturbing adjacent columns, or undo your last edit with a single keystroke.

MED's debugging skills are on a par with *Quattro Pro*'s and *Excel*'s. To help you find and exterminate bugs more easily, the program lets you step through your macro one keystroke or cell at a time and lets you insert break points to pause the macro at a given command, when a cell's value has been changed, or when some other condition has been met. You can monitor the value of up to four variables in a window as the macro executes.

Fantastic! If I'd had this when I was learning to write macros, I could have spent more time at the beach.

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ANTHONY RUSSO

placement—that is, the same number can be selected repeatedly. Sampling without replacement, to produce a set of numbers without duplicates, requires a macro like the one shown in **FIGURE 1**. To build your own copy, start with a blank worksheet and enter the labels shown in column B and the macro commands in column C that begins in row 9. (Be sure to precede each cell entry that begins with \ or / with an apostrophe.) Then put the cell pointer on B2, select */Range Name Labels Right*, paint the range B2..B30, and press **<Enter>**. In cell C7, enter the following formula on one line:

@INT(@RAND*(\V_UPPER—\V_LOWER+1) +\V_LOWER)

(This formula yields a random value within limits determined by the entries in C5 and C4.) To execute the macro, place the cell pointer in an empty column, and press **<Alt>-R**.

The macro prompts the user for the number of values desired and their lower and upper limits. Then it uses the formula in C7 (\V_NEXTNO) to generate a random value. Next it checks the new value against numbers already in the sample; if it finds a duplicate, the macro calculates a new value and tries again.

Here's the blow-by-blow of how it works (for a general introduction to macro subroutine organization, including the statements not explained below, see last month's column).

C11 through C16: Ask the user to enter the number of random values desired and the range to sample from. If the user fails to enter one of the values, the macro aborts.

C17 aborts the macro if the number of values requested is greater than the range to sample from; otherwise the macro would run forever without completing the sample.

C18 creates a temporary range name to hold the sample values.

C19 checks to see if there's already something in the target range, and if so, beeps, deletes the temporary range name, then aborts the macro.

C21 is the main processing loop, which, using the counter cell \V_CT_1, repeats the subroutine \R_1 to generate \V_N random values.

C22 sorts the sample values in ascending order.

C23 deletes the temporary range name and turns off the 'wait' message.

C25 begins subroutine \R_1 by using the formula in C7 to generate a new random value.

C26 tests for duplicate values. Using the counter cell \V_CT_2, it executes the subroutine \R_2 (in C31) once for each value already in the sample.

C27 checks whether subroutine \R_2 found a duplicate, and if so, returns execution to cell C25 to try a new value.

C28 executes if the new value (\V_NEXTNO) is unique, putting that value into the target column in the current row (\V_CT_1).

C31 begins subroutine \R_2, which checks the current random value (\V_NEXTNO) against each number already sampled. If a match is found, it stops checking and returns execution to cell C27.

Once you've succeeded in creating a general-purpose macro like this, you may want to add it to your macro library. To find out how to set up a macro library in *1-2-3* release 2.*x*, 3.*x*, or *Quattro Pro*, stay tuned for next month's *Spreadsheets A..Z*.

```
     B        C
1
2    \V_CT_1
3    \V_CT_2
4    \V_LOWER
5    \V_UPPER
6    \V_N
7    \V_NEXTNO      0
8
9    \R           {}
10                {paneloff}
11                {getnumber "Number of values? ",\V_N}
12                {if @iserr(\V_N)}{quit}
13                {getnumber "Lower limit? ",\V_LOWER}
14                {if @iserr(\V_LOWER)}{quit}
15                {getnumber "Upper limit? ",\V_UPPER}
16                {if @iserr(\V_UPPER)}{quit}
17                {if \V_N>\V_UPPER-\V_LOWER+1}{beep}{quit}
18                /rncXXX_TARGET~{bs}.{d \V_N-1}~
19                {if @count(XXX_TARGET)>0}{beep}/rndXXX_TARGET~{quit}
20                {indicate "Wait please..."}
21                {for \V_CT_1,0,\V_N-1,1,\R_1}
22                /dsrdXXX_TARGET~pXXX_TARGET~a~g
23                /rndXXX_TARGET~{indicate}
24
25   \R_1         {recalc \V_NEXTNO}
26                {for \V_CT_2,0,\V_CT_1-1,1,\R_2}
27                {if @index(XXX_TARGET,0,\V_CT_2)=\V_NEXTNO}{branch \R_1}
28                {put XXX_TARGET,0,\V_CT_1,\V_NEXTNO}
29                {return}
30
31   \R_2         {if @index(XXX_TARGET,0,\V_CT_2)=\V_NEXTNO}{forbreak}
32                {return}
```

FIGURE 1: This <Alt>-R macro produces a list of unique random numbers.

Questionable Spreadsheets Department

This month, *Spreadsheets (A..Z)* kicks off our *Questionable Spreadsheets Department* with a timely question from Brian Richardson of Nashville. If you have a spreadsheet problem that's been bugging you, let us know about it.

(continues)

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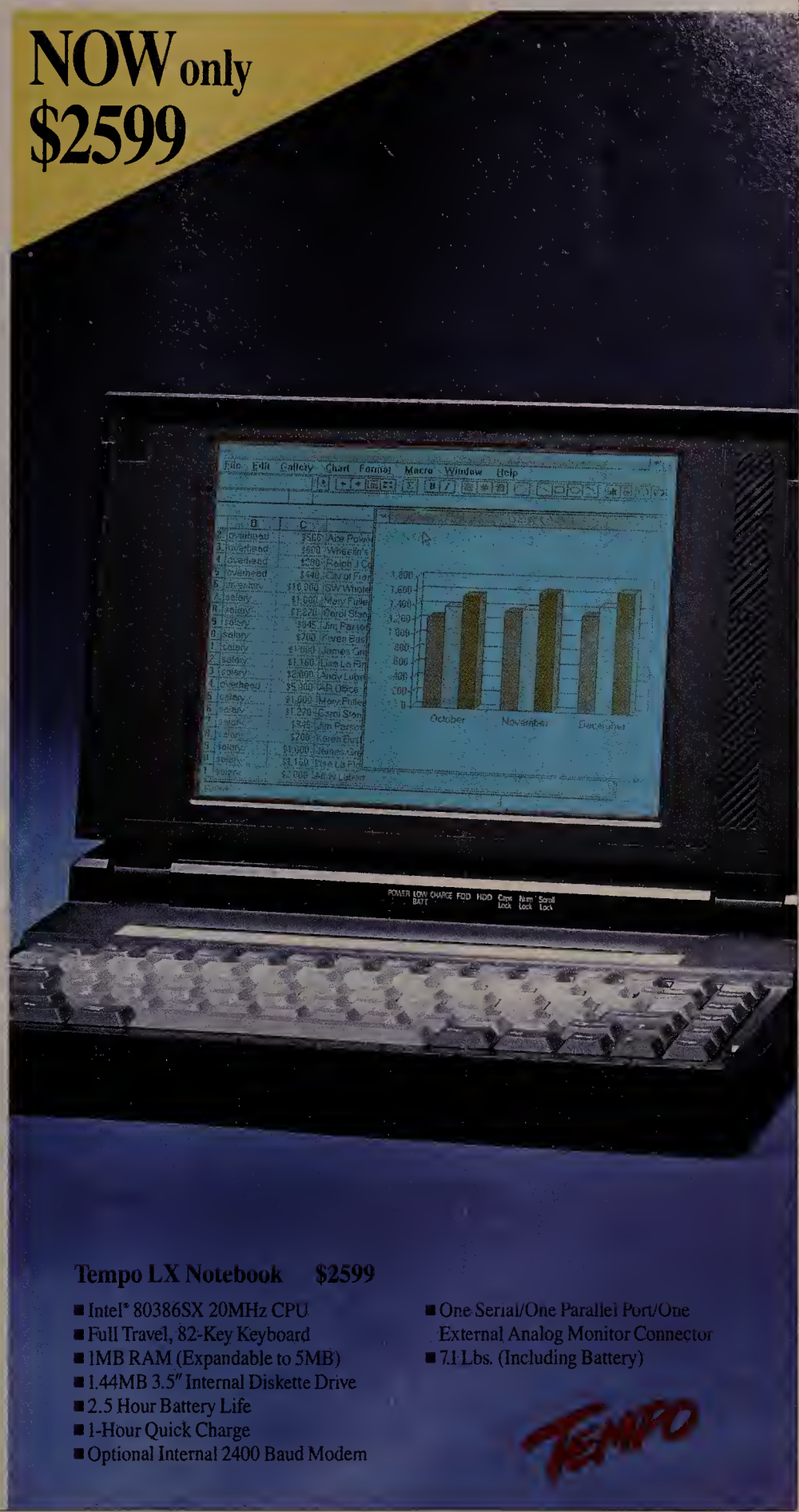

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Q. *I'm using* 1-2-3 *to track turnaround time in our data processing center. I enter the date and time each job was submitted and the date and time the user picked up the output; I use a formula to calculate the duration in hours and minutes. The formula works as long as the job is submitted and retrieved on the same day, but how can I make it calculate from one day to the next?*

Brian Richardson
Nashville, Tennessee

A. *1-2-3,* like *Excel* and *Quattro,* figures dates by counting days starting from January 1, 1900 (day 1). Hours are counted as decimal fractions of the 24-hour day. For instance, the unique code for 6 a.m. October 29, 1991 is 33540.25. That is, it's the 33,540th day of this century, and .25 (25 percent) of the day has passed. (Actually, it's the 33539th day. The date function includes February 29,

(continues)

Excel Shortcut

A Timely Answer to the Problem of Date Labels

Ralph Soucie

Back in the days of low-tech spreadsheets, entering monthly headings across the top of a worksheet was laborious. It was especially tedious when you needed the dates in complete month-day-year format, as for tax-form attachments with "Month ending ..." headings.

Excel's Data Series command, however, automates the procedure to the max. Let's suppose you need month-end dates, beginning with October 31, 1991, at the top of columns B through M. Enter the beginning date in cell B1. Then select the entire range B1 through M1. Finally, choose the *Data Series* command to bring up the Series dialog box.

Choose the *Month* option in the Date Unit group. *Excel* then enters the entire series (October 31, November 30, December 31, and so on) in the selected range. (Naturally, *Excel* knows that 1992 is a leap year, so February 29 is displayed in cell F1.)

Another date unit option in the dialog box, Weekday, is useful when you want a series of consecutive dates excluding Saturdays and Sundays.

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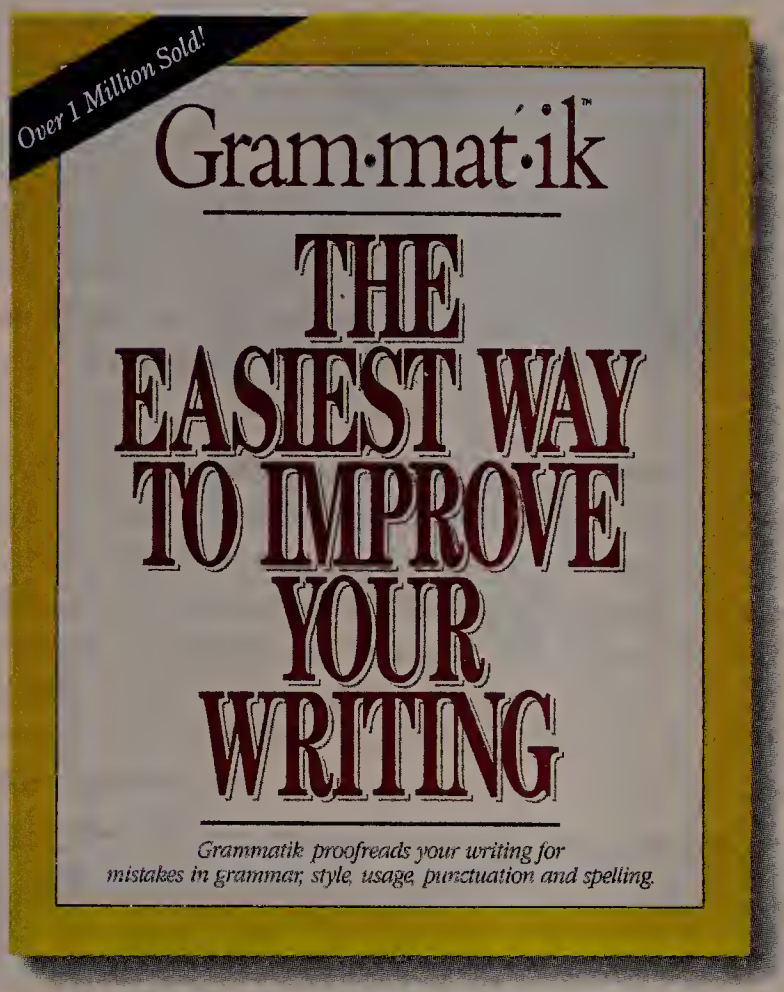

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PCW1091

1900, a nonexistent day.)

The trick in figuring durations is first to use the appropriate @ functions to get your starting and ending dates and times into *1-2-3*'s decimal date format; then subtract to get the difference in days; and finally, convert from days to another unit of measure. For a simple example, let's calculate your age. If you enter your birth date as a label (i.e., preceded by an apostrophe) in cell B1, this formula will calculate your age:

@INT((@NOW-@DATEVALUE(B1))/365.25)

Here's how it works: @DATEVALUE(B1) converts the label in B1 into a decimal date value. @NOW computes the decimal value for the current moment, taken from the computer's internal clock. The difference between the two is your age in days. Dividing by 365.25 (the average number of days in a year, allowing for leap years) converts the age to years, and the @INT() function removes the decimals.

Now let's turn to Brian's problem. In

	A	B	C	D	E	F
1	DURATION CALCULATIONS					
2						
3			Submitted	Retrieved		
4		Date	6/28/91	6/29/91		
5		Time	23:30	12:30 am		
6						
7		Moment code:	33417.9791667	33418.0208333		
8						
9			Durations:	0.04166666667	days	
10				1.00000000012	hours	
11				60	minutes	
12				1	integer hours	
13				0.0	remainder minutes	
14			Turnaround:	1:00		

FIGURE 2: Using the formulas discussed in the text, this worksheet calculates the time elapsed between the submission of a job and its completion.

FIGURE 2, the dates the jobs were submitted and retrieved are entered into C4 and D4; the times (in 24-hour military notation or conventional format) in C5 and D5. The logic proceeds as follows:

C7: @DATEVALUE(C4) +@TIMEVALUE(C5) computes the date value for the day and time the job was submitted. @TIMEVALUE() converts a label into *1-2-3*'s fractional day metric. The same formula, copied to D7, computes the date value for the day and time the job was picked up.

(continues)

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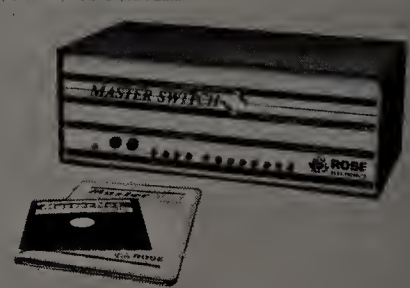

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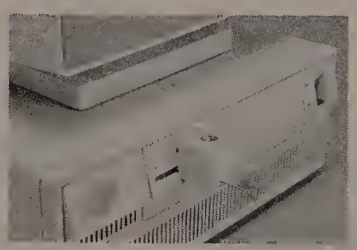

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D9: +D7-C7 subtracts the retrieval time from the submission time to calculate the job duration in days.

D10: (D7-C7)*24 converts the job duration to hours. Notice the rounding error: This formula should yield 1.0.

D11: @ROUND((D7-C7)*1440,6) multiplies the job duration by 1440 (24*60) to convert it to minutes; the @ROUND() function curbs the rounding error at the 6th decimal place. (That's on the order of .01 seconds; a difference of 1 second shows up at the 4th decimal place.)

The next two formulas break the duration down into separate hour and minute components.

D12: @INT(@ROUND((D7-C7)*24,6)) uses @INT() to trim the decimals from the hours calculation, in this example rounded to 6 decimals.

D13: @ROUND(@MOD((D7-C7)*1440,60),6) uses @MOD() to give the remainder when one number (in this case the duration in minutes) is divided by another (60—the number of minutes in an hour).

D14: @STRING(D12,0)&":"&@IF(D13<10,"0","")&@STRING(D13,0) recombines the hours and minutes into a label showing duration in conventional format. @STRING() converts the numerical hours and minutes to labels, and the string operator (&) pastes a colon between them.

Date formulas are a challenging arena for spreadsheet users, but there's no end to the nifty tricks you can perform with a few well-turned @ functions!

Send your spreadsheet questions to Richard Scoville, CompuServe 72341,2727; MCI Mail 357-4517; 415/442-1891 (fax); or mail them to Spreadsheets (A..Z), PC World, *501 Second St. #600, San Francisco, CA 94107.* PC World *pays $50 for published questions. Sorry, we cannot acknowledge submitted materials.*

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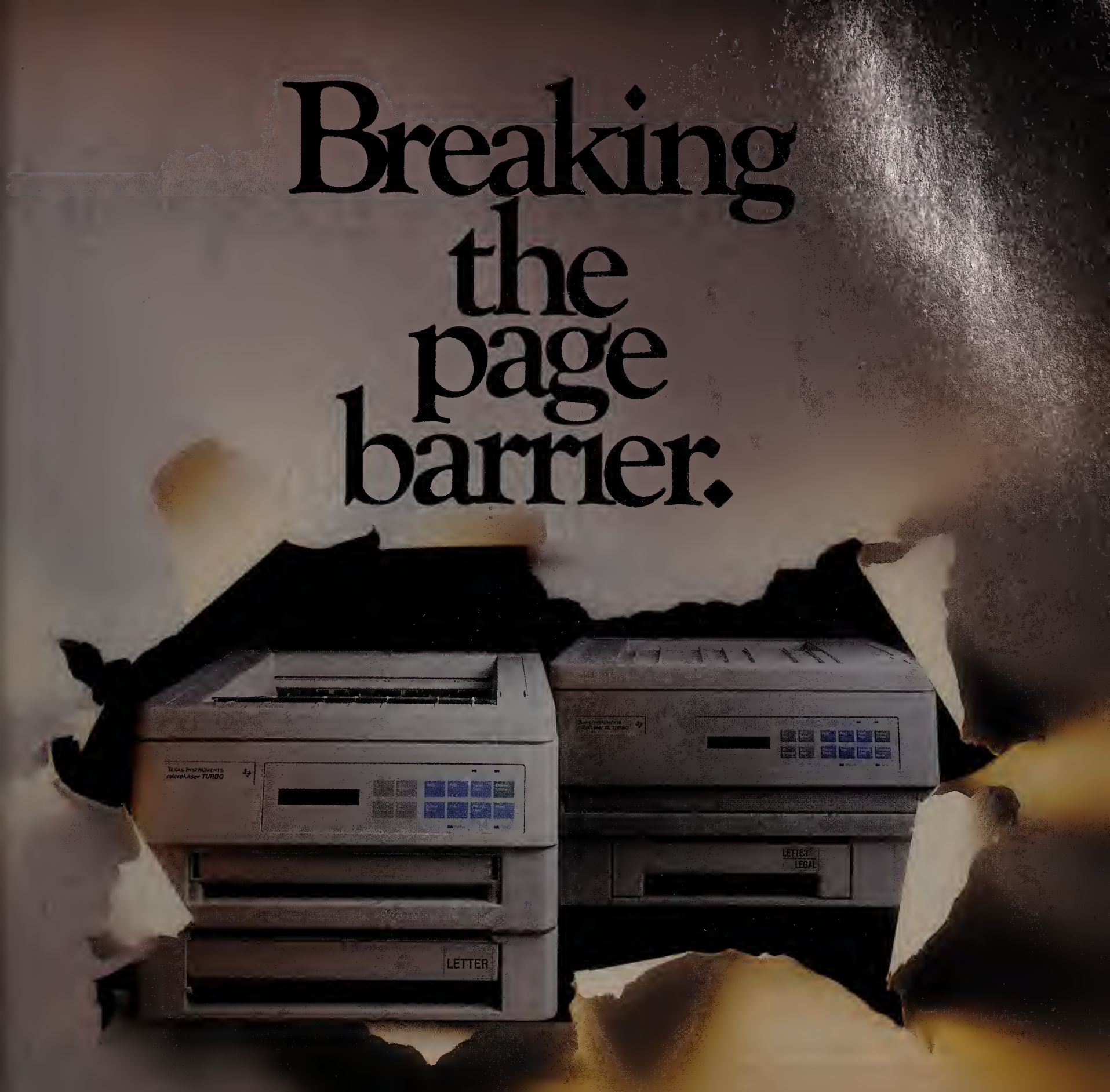

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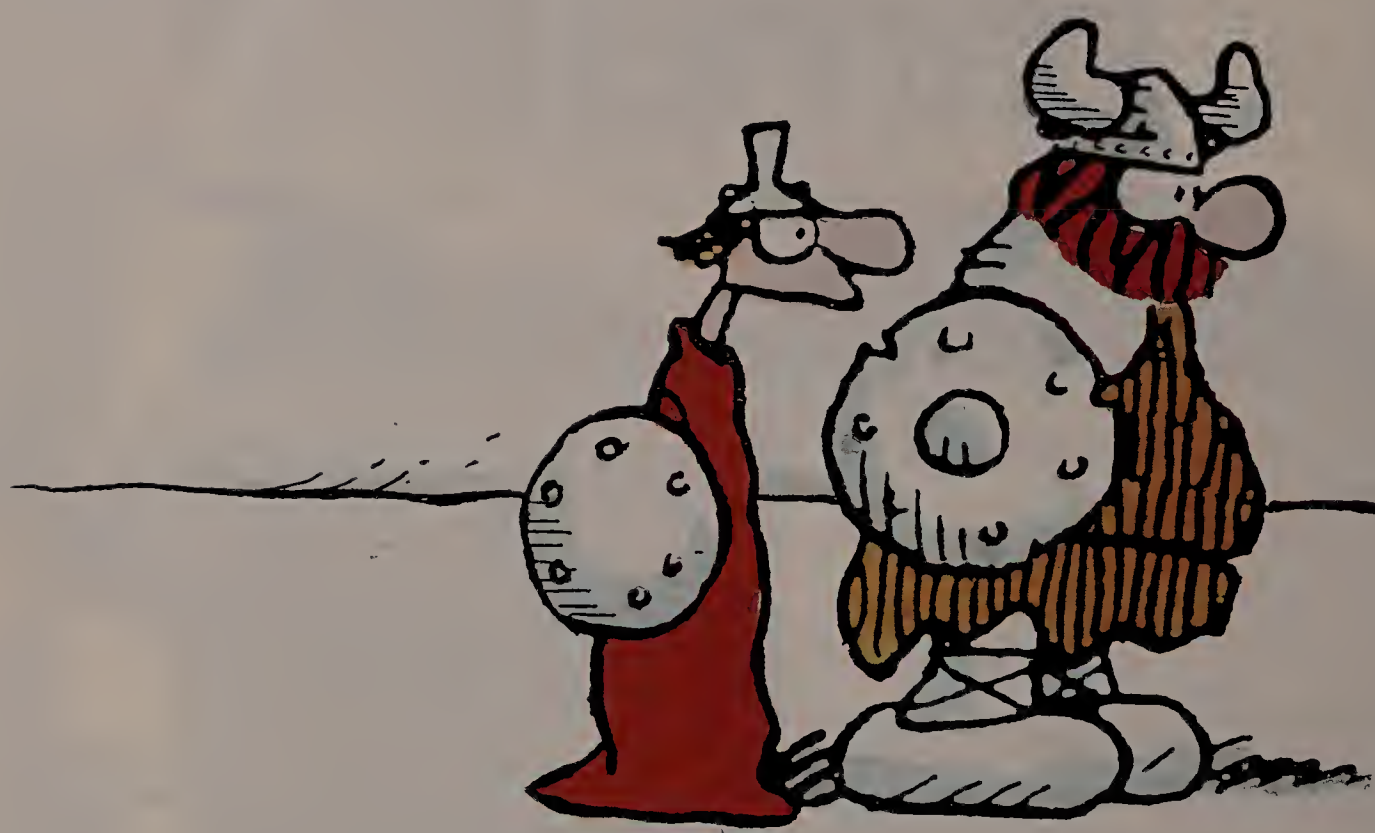

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3D Vectors/Second	NA	400K	800K	990K
Lighted 3D Gouraud-shaded triangles/Second	NA	20K	80K	120K

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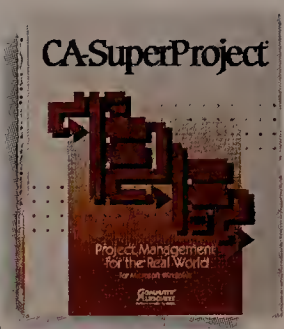

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* March 1991 study published by 1Soft Decision, Inc., including CA-SuperProject 2.0, Microsoft Project For Windows, Symantec's Timeline 4.0, ABT Project Workbench and Scitor's Project Scheduler-5.

Circle 39 on reader service card

WORD PROCESSING CLINIC

Tips for getting the most out of your word processor

George Campbell

Q. *I love* WordPerfect 5.1*'s menu system, but I hate having to press the right-hand mouse button to display the commands. Any ideas?*

Robert Winkley
Denver

A. Sure, but you'll have to go three menus deep to display the commands. Next time you fire up the program, follow this sequence to make the menus display full-time: **<Shift>-<F1> DMVY<F7>**. Watch the results of each command. You may find other changes you'd like to make to *WordPerfect*'s defaults. The **<Shift>-<F1>** setup command lets you set options from mouse and cursor speed to screen colors.

Q. *Someone told me that* WordPerfect *can save files with long, descriptive file names. Can you tell me how to do this?*

Alice Westerberg
New York

A. Long file names are one of *WordPerfect 5.1*'s niftiest and least-known features. To enable this option, press **<Shift>-<F1>EDLY**, then **<F7>**.

From now on, when you save a file *WordPerfect* will prompt you for a long file name. You can enter as many as 68 characters, including spaces and foreign symbols. Hit **<Enter>** when you're done, and you'll see a prompt for the document type. Here you can enter a long file name with as many as 30 characters. Press **<Enter>** again, and *WordPerfect* will prompt you for a shorter file name, proposing the first 8 characters of the long name as the file name, and the first 3 characters of the document type as the extension. You can accept this or change it to another file name.

You can use the <F5> command to list the long file descriptions. Because the default setting for file listing doesn't display long descriptions, you'll need to change it so that you can see them every time you use the program. Do this by pressing **<F5><Enter>SL<Enter>**. You can use the Retrieve, Copy, Delete, and other commands in the list menu with these long file names.

You can also see long descriptions by calling up the document summary of a file you've loaded into *WordPerfect*. To do this, press **<Shift>-<F8>DS**. The document summary shows the entire description and other information about the file. Once you use this feature, you'll never go back to short file names again.

Q. *Every morning when I start* WordPerfect 5.1, *I see a message at the bottom of the screen that reads, 'Are other copies of WordPerfect currently running? (Y/N)'. I'm sick of having to type* N *before continuing. Is there a way to skip this?*

Katherine Jaeger
San Francisco

A. The message is appearing because you once turned off your computer with-

(continues)

```
Current Directory                          .              <Dir>
Parent Directory                           ..             <Dir>
Complaint response -- Alan Bla Letter      0903AB  .LET   4,147  09-03-91 11:50a
Complaint response -- Walter B Letter      0907WB  .LET   5,678  09-07-91 02:27p
Complaint to Amalgamated Traps Letter      0913AT  .LET   4,703  09-13-91 09:40a
Follow up to Eric North        Letter      0905EN  .LET   3,591  09-05-91 01:14p
Price Quote to Clean Industrie Letter      0909CI  .LET   3,533  09-09-91 09:47a
Price Quote to William Johnson Letter      0912WJ  .LET   2,408  09-12-91 10:32a
Product Announcement to Alan B Letter      0915AB  .LET   3,540  09-15-91 02:29p
Query to Andrew Marvell        Letter      0912AM  .LET   4,703  09-12-91 03:39p
Query to Samuel Carter         Letter      0914SC  .LET   4,230  09-14-91 04:13p
Query to Sarah Wilkinson       Letter      0906SW  .LET   3,799  09-06-91 09:29a
Quote to Bill Greenwood        Letter      0903BG  .LET   2,339  09-03-91 10:14a
Sales Letter to Alltrades      Letter      0906AT  .LET   3,937  09-06-91 02:29p
Sales letter to Amalgamated Tr Letter      0902AT  .LET   2,269  09-02-91 09:11a
Sales Letter to Aurora Halsey  Letter      0907AH  .LET   3,034  09-07-91 04:27p
Sales letter to Bart Williams  Letter      0903BW  .LET   1,851  09-03-91 11:19a

1 Retrieve; 2 Delete; 3 Move/Rename; 4 Print; 5 Short/Long Display;
 Look; 7 Other Directory; 8 Copy; 9 Find; N Name Search: 6
```

A little-known feature in WordPerfect lets you give your files descriptive names up to 30 characters long, so you can find your files more easily.

ANTHONY RUSSO

out exiting *WordPerfect* properly. This causes the program to think it's already running when you try to start it.

To avoid this message, exit *WordPerfect* before shutting down for the day—save your current file, then press <F7>NY. Note: You should always exit programs before turning off your system.

Q. *One thing in the* Word for Windows *macro language has me stymied. There doesn't seem to be a way to pause a macro so that I can move the cursor or type in the document. Is there a way around this?*

Abraham Gostman
Cleveland

A. It's sad but true—there's no such command in *Word for Windows*. While previous versions of *Word* offered a PAUSE command in their macro languages, *Word for Windows* lacks this capability. Worse, you can't call up dialog boxes like the search and replace boxes and let the user fill out the command. Until Microsoft corrects this omission, all you can do is exit the macro, then run a different macro to continue automating actions after you've worked on the document.

If you need the pause feature and are willing to change programs, you'll find the functions you need in *Ami Pro*'s macro language. The UserControl() command in that program does exactly what you want, and you can call any dialog box and let the user fill it in as well.

Q. *I like version 5.5 of* Word, *but I'm having trouble adjusting to the new commands. Is there anything I can do short of going back to version 5.0?*

Eric Nordstrom
El Paso

A. You bet there is. *Word 5.5* lets you configure the program to use the version 5.0 function key commands. Here's what you do to set it up:

Start *Word*, then press <Alt>-US<Alt>-5<Enter>. Now these familiar function key commands will work as before. You won't see any immediate changes, but when you use *5.0* commands such as <F7> to select the word to the left and <Shift>-<F10> to select the entire document, they will work as they did in *Word 5.0*.

Send your word processing questions to George Campbell, CompuServe 71571,222; MCI Mail GCAMPBELL; 415/442-1891 (fax); or mail them to World Processing Clinic, PC World, *501 Second St. #600, San Francisco, CA 94107.* PC World *pays $50 for published questions. Sorry, we cannot acknowledge submitted materials.*

George Campbell is a contributing editor for PC World *and a shareware author.*

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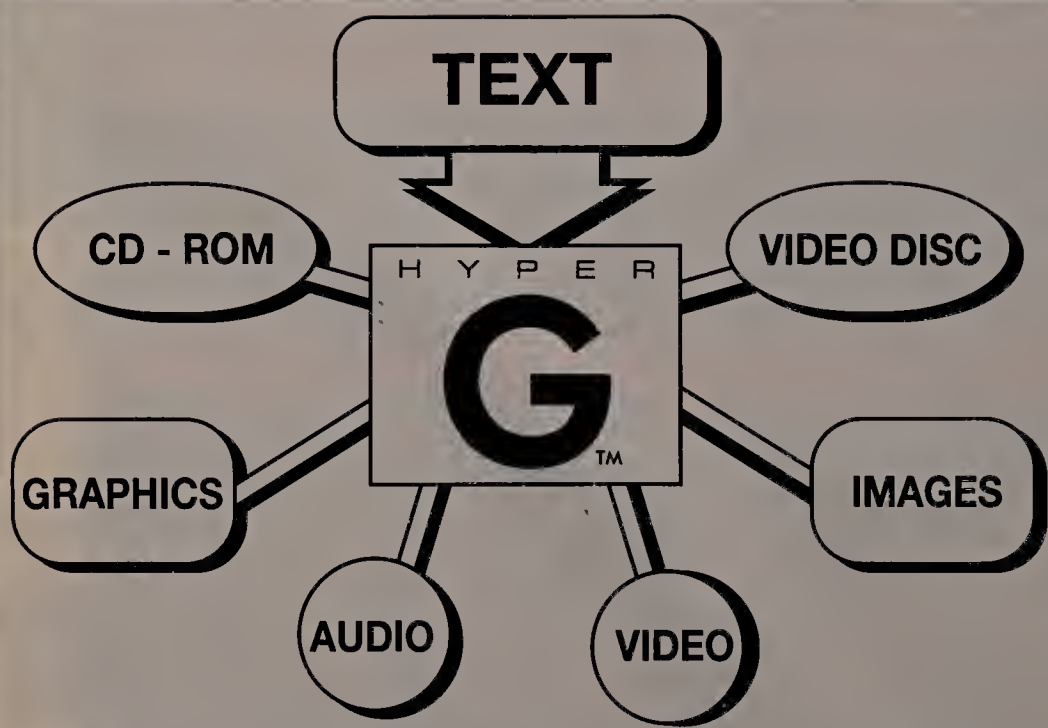

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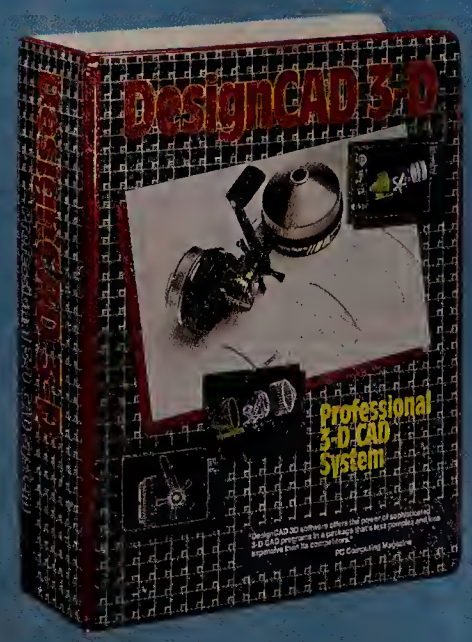

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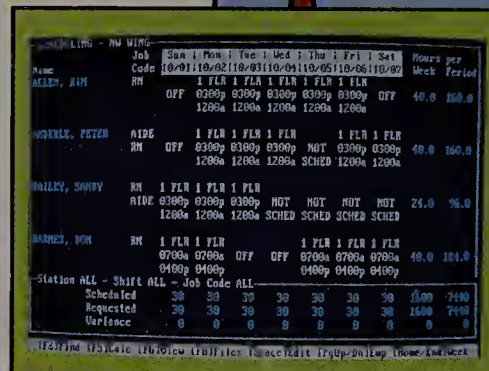

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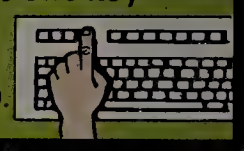

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DATA BASICS

Tips and techniques for managing your data

Steve Cummings

The Total Sort

Q. *My company uses* dBASE IV *to manage invoices. We record each sale item's unit price and quantity sold, but not the total price. How can I list the line items by total price, starting with the highest?*

William Starner
Dallas

A. You've probably already used *dBASE* indexes to sort data by a given field. For example, LINEITEM is probably already indexed by the invoice number. But *dBASE* also lets you index by calculations, and you can calculate the total price.

To index by a calculation, select your file in the Control Center and choose *Modify structure Order.* At the resulting screen, select *Organize Create new index.* Name the index **TOTALPRICE**, and—assuming your fields are called UnitPrice and Quantity—enter **UNITPRICE * QUANTITY** for the 'Index expression.' Highlight the *Order of index* option, and press <**Enter**> to select Descending. To create the index and return to the Control Center, press <**Ctrl**>-<**End**>, then <**Alt**>-**E** and <**Enter**>. Whenever you select TotalPrice as your *index,* your line items will be sorted by their totals.

A Capital Paradox

Q. *I regularly enter data into my* Paradox *sales contacts data base, but I'm prone to typos. Is there a way I can at least ensure that every name starts with a capital letter?*

Rebecca Newman
Los Angeles

A. This sort of error checking is just what the *Paradox* ValCheck feature is for. To have *Paradox* capitalize the first letter of every entry in a given field, start with the table in question in either the DataEntry or Edit mode. Press <**F10**>, and select *ValCheck Define* and the field you want to validate. Press <**Enter**> and select *Picture.* Type **&*?** and press <**Enter**>. You will then be back at your editing screen, but now you will be allowed to type only letters into the field, and the first letter will automatically be capitalized.

The cryptic text &*? is a template that tells *Paradox* what characters are allowed in the field and how to format them. To see how the codes in this template work, and to learn about other codes, check the Modify chapter in the user guide, or press <**F1**> for help when you're at the 'Picture:' clause.

(continues)

Reader Tips

Finding an Empty Place

Sometimes the records you need are those where a given field is empty. Perhaps you must ensure a field wasn't left empty by mistake, or you need to find persons not affiliated with a company. In *Alpha Four* and other *dBASE*-compatible systems, you can do this easily by searching with the expression *Fieldname* < "!", with *Fieldname* being the name of the empty field.

For instance, in *Alpha Four,* you select *Search Lists* from the main menu, choose *One-time Search* and then *Table Mode.* In the Search Table screen that appears, you enter the name of the field in the Field column, the < in the Op. column, and ! in the Search for What column. Pressing <**F10**> twice initiates the search, and *View/enter records* shows you the records that lack entries in the selected field.

How does this work? The blank space is the first visible (noncontrol) character in the ASCII code, and the exclamation point is the second. Spaces are therefore the only characters "less than" an exclamation point. Because a blank field in a DBF file is actually filled with blank space characters, the above expression will find any fields that start with a space.

Diana Chambers
Newark, New Jersey

ANTHONY RUSSO

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Create single keystrokes for your most often used commands

Macro Power

At the heart of the Macintosh's user-friendliness is its use of pull-down menus to bring the various features of a particular software package under control of the mouse. While this use of menu items is easy and quickly learned, it is not the fastest way to call up frequently used commands. Some programs allow users to access some commands with keyboard equivalents (such as the standard Command-S to save a document).

Figure 1: The MacroMaker main dialog.

Once the program becomes familiar, most users begin to tire of having use the

are hidden. If you use an extended keyboard, you can assign one of the function keys to the job. But those of you with smaller keyboards can use another method such as one of the keypad keys or a key combination using the Command or Option keys. Be sure to use a combination not already used by RSG/DS.

It's a good idea to refrain from using the keypad keys so that when you open the Calculator desk accessory while running RSG/DS, you can use the keypad with no conflicts. If you use the keypad keys for macros, it is best to use them in combination with other keys to avoid launching a macro when you operate the Calculator.

Step by Step

To create a macro, first make sure that MacroMaker and Macros are installed in

Fine-tune pictures and add special effects

Picture Perfect!

Most DTP programs scale, stretch, rotate, and change a few attributes of graphics. RSG/DS have an entire integrated image processing utility for handling RIFF and TIFF images. The graphics Image Control dialog box (Figure 2) within the Edit menu is something that many people notice, but few ever use seriously. It is contains terms and concepts that many people never find a use for. At the least they shy away from modifying graphics for fear of ruining the picture. As you will see, experimenting with the Image Control menu can be rewarding, and anything you do can always be undone.

INPUT OUTPUT
10% → 10%
20% → 20%
A: Normal Contrast
10% → 90%
20% → 80%
B: Negative Contrast

Figure 3: Brightness control darkens or lightens the image.

Figure 4: Contrast changes the threshold between dark and light.

10% gray, the displayed gray value of that pixel (output value) will also be 10%.

An important thing to remember is that no matter what image changes you make, you

The journal for involved QuarkXPress users!

QuarkXPress In-Depth

VOLUME 1, NUMBER 7

Careful planning is crucial to getting it right the first time

■ IN-DEPTH ■ APPLICATION ■

Planning to Print

by Neil Oliveria

Desktop publishing can streamline the production process, shorten schedules, and save money. These goals are realistic, but elusive. Inadequate planning can cat up valuable time and money. In a worst case, the imagesetting of a project can deteriorate to a trial-and-error fiasco, and the printing can produce a result that is far below expectations.

This article focuses on the process and pitfalls involved with imagesetting and printing the final document. The *printer* referred to is the person(s) responsible for reproducing the document – either an in-house printing department or an external service bureau. We will also explore some of the advanced printing controls for color and graphics in QuarkXPress version 3.

Spend Time... Not Cash

The first rule for successful printing is to know your printer! Review the job with your printer early in the development. Supply the printer with laser printed proofs and test sheets. Learn the limitations of your printer's equipment.

Review fonts, colors, paper size, trim requirements, layout registration needs, dot resolution, and the myriad of other options. Don't wait until a large job is completed to learn that the printer's screen font for Helvetica (or another font) is different than the one you've been using. Provide the printer with files for all downloaded fonts used by your project.

One of the most common pitfalls in

continued on page 6

Publish with Style

It is surprising that style sheets are not more widely used. They're easy. If you find that you are constantly switching back and forth between fonts and formats in a project, then a few minutes spent in setting up style sheets can save a lot of time and tedium.

Style sheets let you group a complete set of character and formatting attributes under a single style name. Then you can apply those attributes to paragraphs by using the style name or a special keyboard combination that you specify. For example, you can specify that the *first paragraph* in a story will use a drop cap, fixed leading, no indents, and a specific font and size. Whenever you start a new story, selecting the style name for *first paragraph* will set up the complete format with one step, ready for typing.

Style sheets are also powerful tools for making sweeping changes throughout a document. When you create a new style, you can *base* it on an existing style. Then, when you change the base style, all of the

continued on next page

Figure 1

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In addition to selecting individual fields to index on, FoxPro lets you index on an expression using one or more fields (see Index Expression box in lower left corner).

Assorted Names

Q. *How do I sort my* FoxPro *customer mailing list so that George Jones comes before Phil Jones? If I index a file on the Lastname field, the customers are arranged alphabetically by last name, and when I index on the Firstname field, they're in order of first name. How do I combine the two?*

Norman Hertzog
Gary, Indiana

A. There's an easy solution to this one —index the file on the Lastname and Firstname fields together. When you create your index, use the Index Expression **Lastname + Firstname** rather than simply selecting a field.

Send questions to Data Basics, PC World, *501 Second St. #600, San Francisco, CA 94107; CompuServe 74055,412; MCI Mail 179-3813; 415/442-1891 (fax).* PC World *pays $50 for published questions. We cannot acknowledge submitted materials.*

Steve Cummings is the author of Understanding Quicken *(Sybex, Alameda, California, 1990) and a* PC World *contributing editor.*

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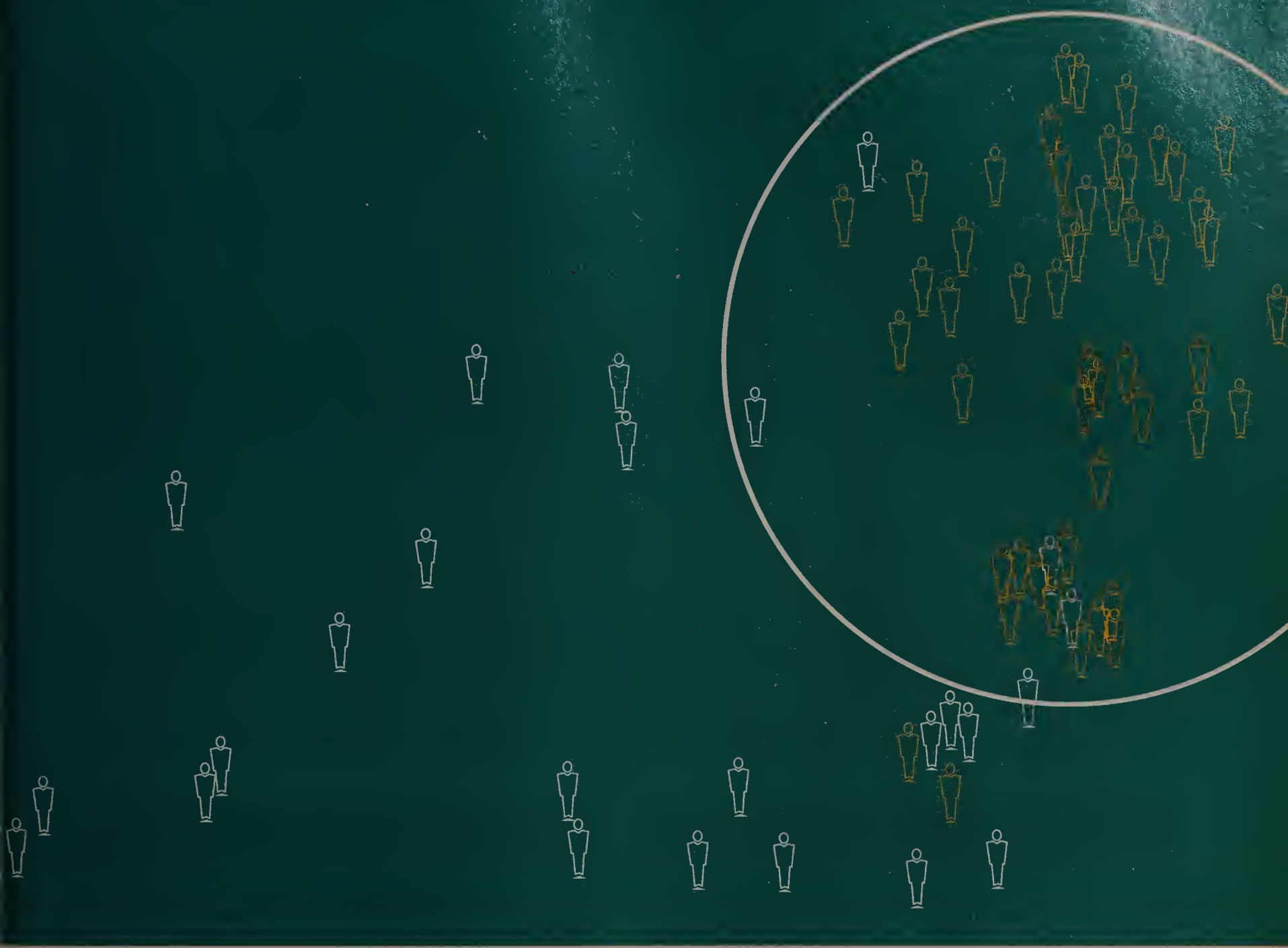

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PUBLISHING & PRESENTATIONS

Expert advice for creating high-impact documents and presentations

Richard Jantz

You just spent $500 on a high-powered presentation graphics program. Now what? While programs like *Harvard Graphics* and *Microsoft PowerPoint* let you create sharp-looking text and data charts, they don't always tell you how or when to employ them. This month we offer a quick visual tour of the most common presentation charts.

Let's say you work for Pirex, an imaginary company that markets lawn-care products. Your goal is to persuade Pirex's board of directors to increase the firm's market share by acquiring another company. The gist of your presentation: Zygro is a more logical acquisition than market leader LawnPro.

The accompanying figures show you how you can use different types of charts to support your argument. **FIGURE 1** outlines your main points. **FIGURES 2** through **6** illustrate each of these points using an appropriate type of graph.

All the charts use the same fonts, colors, background, and logo for a consistent look. We created them in *PowerPoint* for output as 35mm slides—hence the dark backgrounds and light text. For overhead transparencies, use a light background and dark text.

Armed with the right kinds of charts, you'll be able to make your points faster and more persuasively.

Do you have a document or presentation chart you'd like redesigned by professionals? Send your publishing and presentations questions, as well as redesign candidates, to Richard Jantz, MCI Mail RJANTS; 415/442-1891 (fax); or mail them to Publishing & Presentations, PC World, *501 Second St. #600, San Francisco, CA 94107.* PC World *pays $50 for published questions. Sorry, we cannot acknowledge submitted materials.*

Contributing editor Richard Jantz is author of the forthcoming Ventura Publisher 4.0 for Windows *(John Wiley & Sons, New York, 1991). Jon Fach, a chartered financial analyst and consultant in Lafayette, California, also contributed to this article.*

FIGURE 1: About 70 percent of most presentations consist of text charts like this bulleted list. Here we see your argument in a nutshell: Zygro is the one to buy. A good word chart contains six lines of text or fewer, each set off by a graphical marker or bullet. Use no more than two typefaces for each chart, with characters at least 18 points high (about ¼ inch) in uppercase and lowercase for better legibility. For dramatic effect, you could turn this into a build series of six slides, in which a new line of text is added on each successive slide.

FIGURE 2: Use pie charts to show proportional relationships, such as market share, budgets, and demographic rankings. This slide shows at a glance that Zygro owns a major share of the lawn-care market. For easy comprehension, limit the pie to five or six slices, and put the most important slice in the upper right. Placing labels and actual values next to the slices instead of in a legend makes the information instantly accessible. When you use a shaded 3-D effect, "exploding" (separating) the slices makes the smaller ones easier to see.

FIGURE 3: Horizontal bar charts are best for comparing and ranking items at the same point in time, like product sales, inventory, or interest rates. The message presented here is that Zygro's revenues are catching up to market leader LawnPro's, and that Pirex's revenues are growing steadily as well. For easy viewing, the bars are arranged from largest to smallest, with the newest data shown at the top. Instead of displaying the y-axis, actual values are placed next to the bars for quick access to hard data, with the brightest color identifying the most important information. As a general rule, less is more: To avoid cluttering your slide, never use more than 16 bars per chart.

FIGURE 4: Vertical bar charts excel at comparing similar data in different time periods, such as quarterly profits, yearly housing starts, or monthly product sales. A vertical chart is particularly effective for showing negative data, such as LawnPro's dramatic drop in profits. Here it's clear that LawnPro is experiencing some operational problems, while Zygro is showing strong growth. The newest data appears on the left of the chart, with data sets from the same time period clustered together. To keep your graph readable, use no more than four bars per cluster and four clusters per chart. Because the difference between values is not as great as in FIGURE 3, actual values for the bars are not displayed.

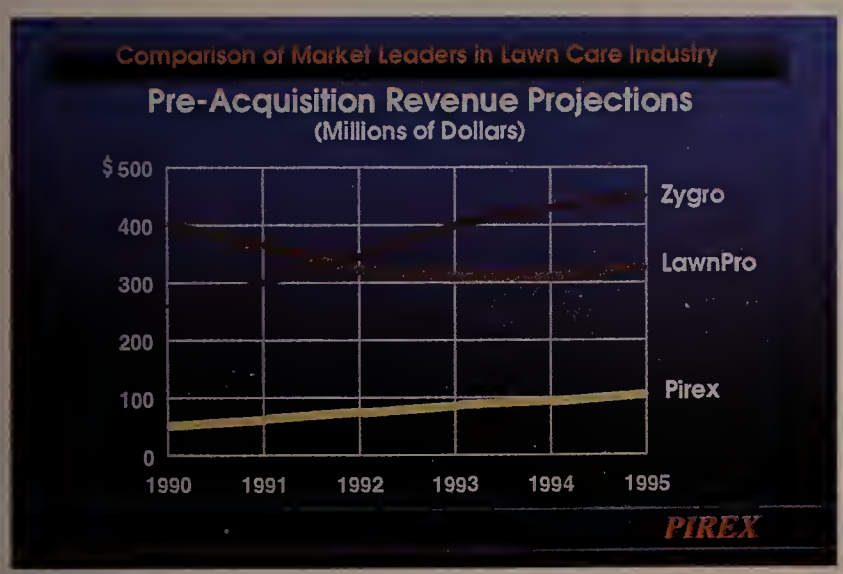

FIGURE 5: Line charts help clarify long-term trends in data like profit projections, and because they can support a large number of data points, they're good for representing continuously variable measurements such as cash flow. These revenue projections show Zygro overtaking LawnPro in late 1991. Line graphs should display no more than three or four trend lines, or data sets. For multiple-line charts, use a different style, width, or color to represent each line, keeping the thickest or brightest line for the data you want to emphasize.

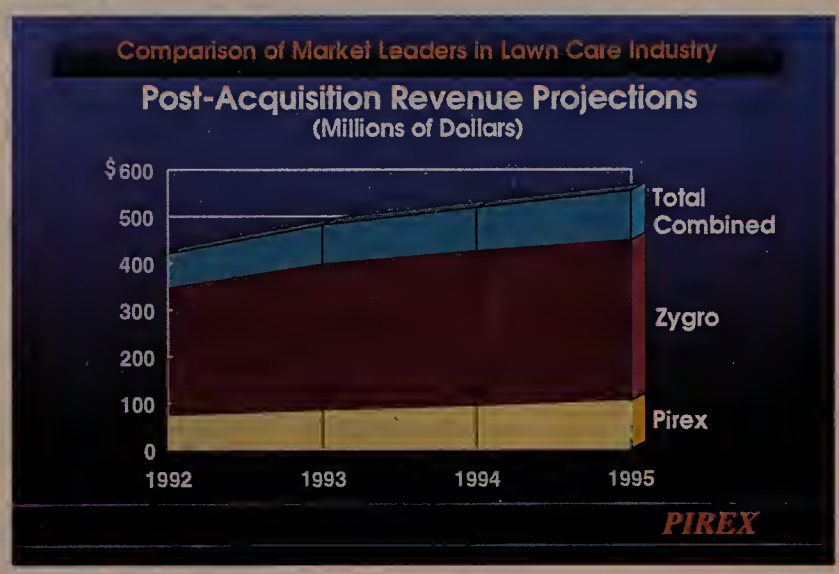

FIGURE 6: Use an area chart to give your audience the big picture: a broad view of a trend or the combined volume of different items over time. As the coup de grace, this chart presents Pirex's projected revenue after acquisition of Zygro. Although the same information could be shown using a line chart, the aqua area at the top reminds the audience that the message here is the combined volume of nearly $600 million in projected revenues that awaits Pirex. The strong visual punch adds a compelling finish to the presentation.

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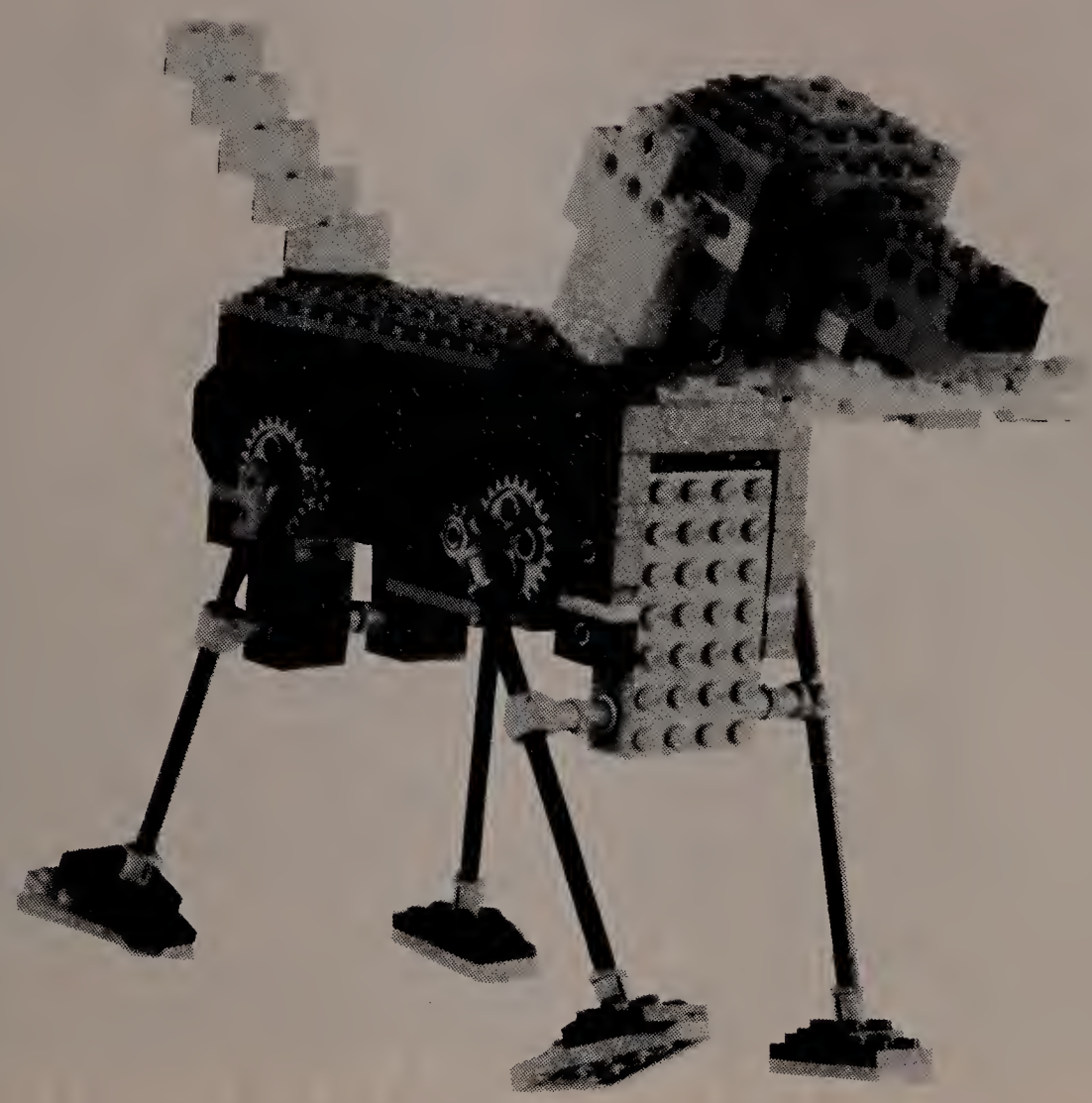

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COMMUNICATIONS Q&A

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Judy Heim

Q. *I need to do a lot of on-line research, but I can't afford huge bills. Would I be better off hiring a professional on-line researcher?*

A. Horror stories about enthusiastic tenderfeet racking up $800 bills in their first month on line are all too common. Before you start fumbling with one of those $100-an-hour information services, consider hiring an information broker. Their fees may *seem* steep, ($50 to $100 an hour, plus on-line costs) but if your research needs are extensive, a broker can prove to be a bargain.

If you decide to go the broker route, look for one who has expertise in your research area; and ask for references and an estimate. A directory of on-line searchers is available for $50 from the Association of Independent Information Professionals, c/o Ray Jassin, 38 Bunkerhill Dr., Huntington, NY 11743; 516/266-1093 (voice), 516/266-6923 (fax).

Q. *I've heard it's easier and cheaper to download stock, bond, and option quotes from GEnie than from CompuServe or Dow Jones News/Retrieval. Is that true?*

A. GEnie's prices are indeed lower than those of CIS and DJN/R—especially at night. Between 6 p.m. and 8 a.m., $4.95 per month buys you closing stock prices—bond, option, and historical quotes cost an additional $6 per hour.

You can speed the retrieval of quotes (and save more money) by combining GEnie's free *Aladdin* software with three scripts by Herb Barnett. The scripts are available as ZIP files in the Charles Schwab Investor's Roundtable (files #435, #406, #388). ALDLYQ-3.ZIP logs on and retrieves the closing stock prices you specify, HSTQUO-1.ZIP downloads historical quotes, and ALLSTKS.ZIP retrieves mutual fund prices.

Q. *I'm hearing a lot about V.42/V.42bis modems. Should I buy one?*

A. Unless you're planning to buy a very basic, bargain-priced modem, the answer is yes. V.42/V.42bis is a new hardware-based standard for error correction (V.42) and data compression (V.42bis); it offers faster throughput than MNP-5 and better error trapping at high speeds. It's built into many 2400-baud modems as well as high-speed 9600-baud modems. In either case, it approximately triples throughput, compared with a doubling of throughput from MNP-5.

Don't confuse V.42/V42.bis with the V.32 or V.32bis protocols, which are high-speed *modulation* standards.

Most modem vendors sell 2400-baud modems with only MNP-5 for less than $200; modems with V.42/V42bis *and* MNP-5 cost about $100 more. CompuServe's 9600-baud nodes and many forward-looking BBS's support V.42/V.42bis; GEnie plans to follow suit next year. You won't become obsolete with MNP-5, but if you want top speed, V.42/V.42bis is the way to go.

Send your communications questions to Judy Heim, CompuServe 71570, 3712; GEnie JUDY.HEIM; MCI Mail 312-7737; Internet 3127737@MCI-MAIL.COM; 415/442-1891 (fax); or mail them to Communications Q&A, PC World, *501 Second St. #600, San Francisco, CA 94107.* PC World *pays $50 for published questions. Sorry, we cannot acknowledge submitted materials.*

Judy Heim is a contributing editor for PC World.

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Directory Assistance

Most users know that the Change Directory command, CD (or CHDIR), followed by the name of an existing directory changes the default directory. Less well known is that you can prefix the directory name with a drive designator. **CD C:\DBASE\DATA** issued from the A> prompt, for instance, changes drive C:'s default directory while A: remains the default drive. You can also use CD with just a drive designator, as in **CD A:**, to simply check a drive's default directory.

Karl Koessel
Technical Editor

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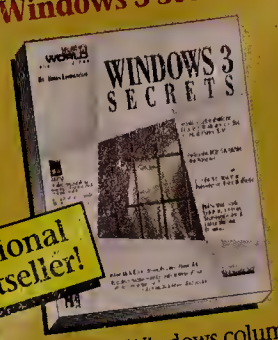

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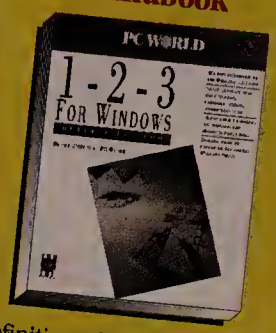

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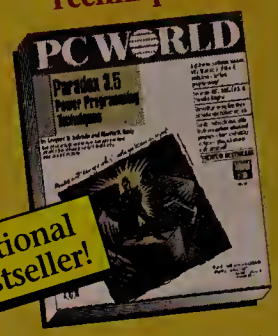

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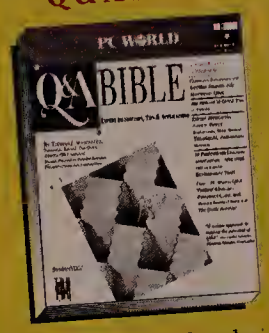

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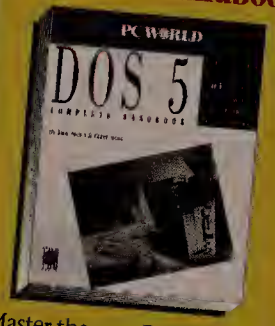

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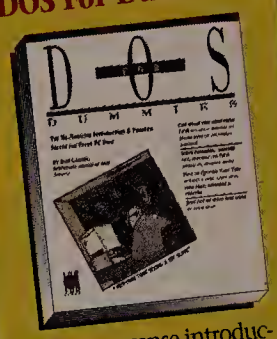

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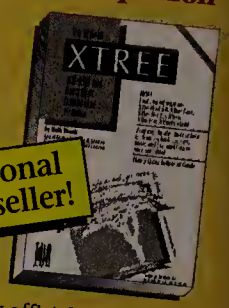

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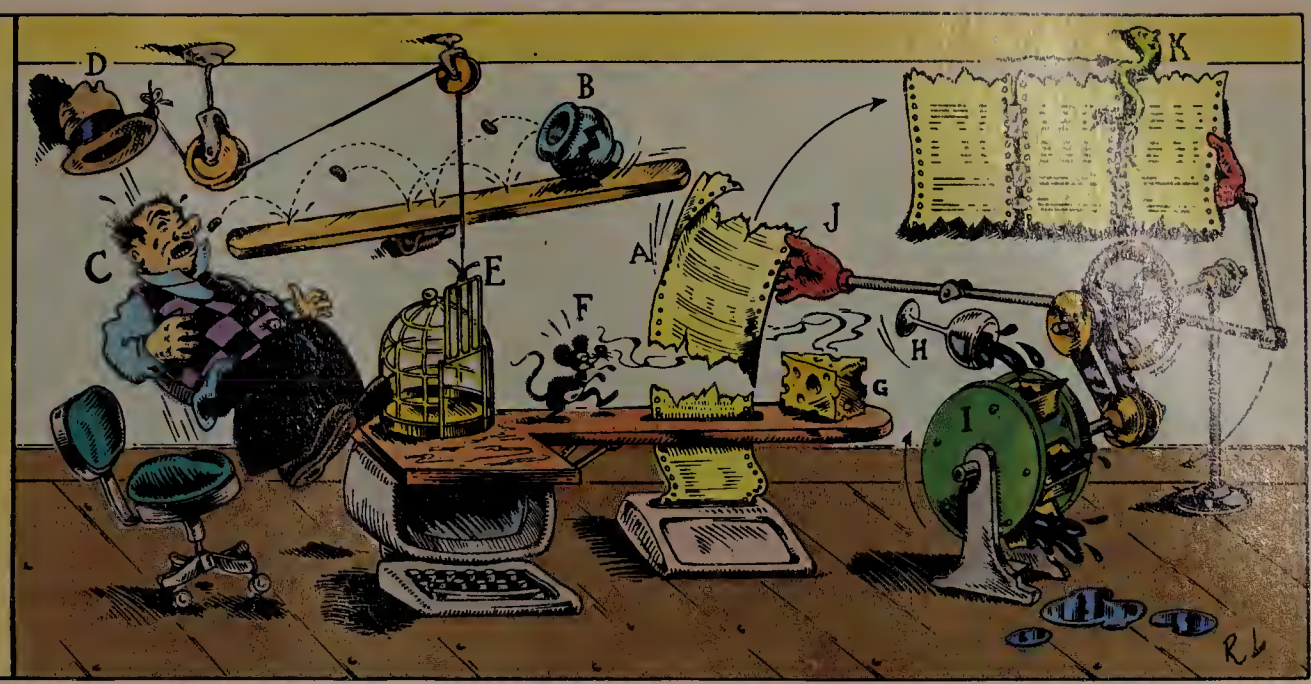
Circle 121 on reader service card

RISING SPREADSHEET (A) KNOCKS MEXICAN JUMPING BEANS (B) INTO MOUTH OF NEUROTIC MAN (C) WHO IS SO DISCOMBOBULATED THAT HIS HAIR STANDS ON END, DISLODGING HAT (D) WHICH OPENS CAGE (E) AND RELEASES EPICUREAN MOUSE (F).

MOUSE, INSPIRED BY SCENT OF PERFECTLY AGED CAMEMBERT CHEESE, GNAWS THROUGH SPREADSHEET, ONLY TO DISCOVER HE HAS BEEN FOOLED BY AROMA OF OVER-RIPE GORGONZOLA (G).

IN A FIT OF PIQUE HE SPILLS VINTAGE WINE (H) INTO WATER-WHEEL (I) WHICH TURNS PULLEY THAT CAUSES GLOVE (J) TO GRASP SPREADSHEET AND MOVE IT TO TAPING AREA.

SHEET IS TAPED SECURELY IN PLACE BY TRAINED ADHESIVE TAPE WORM (K).



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Sideways version 3.3 works with all releases of 1-2-3 as well as other software.
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Circle 148 on reader service card

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fool's gold

In 1983 we introduced the world to the Gold Standard of Technology. Others have followed but never equalled our single-minded pursuit of superior floppy disk performance. And now, 8 years later, we're pleased to present the Maxell Super RD MF2-HD. Don't be fooled by anything less.

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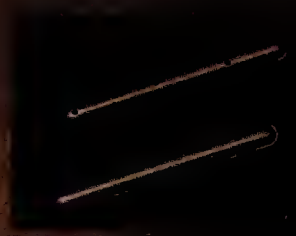
Our new Dual Interlocking Flex Shutter (pat. pending) not only ensures ultra-smooth openings and closings, but a virtually airtight internal floppy disk environment. And our unique Dual Interlocking mechanism greatly reduces the chance that the shutter will be opened or damaged should you drop the disk.

2. Look for a better shell material.

Our composite shell employs a highly flexible material that allows constant contact between the floppy's magnetic disk and your drive head. So no matter what the characteristics of your drive unit, you [illegible] read/write accuracy.



3. Look for enhanced magnetic particle performance.

The Maxell HE Magnetic Particle [illegible] SUPER RD MF2-HD offer superior signal [illegible] stability and a significant improvement [illegible] signal to noise ratio. Which ensures every [illegible] generate a full power signal and enhanced compatibility between machines.

4. Look for the name Maxell.

One name says it all. Reliability. Innovation. Leadership. The Gold Standard. Only from Maxell.

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WINDOWS WORKSHOP

Practical answers to your questions about Windows

Jesse Berst and Scott Dunn

Windows Workshop has taken on a new Q&A look. Starting this month, we're reaching out to you—the busy, harried, or curious *Windows 3.0* user—for your killer questions. Are you wrestling with *Windows* and your LAN? Struggling with PIF settings? Trying to figure out what system resources are? Don't get mad—get informed. Send your questions to *Windows Workshop* in care of *PC World.* We'll print and answer three or four reader questions every month that we hope will help everyone master Microsoft's ubiquitous operating environment.

This month we pull together some of the most common questions and perplexities that *Windows* users face. We await *your* questions next month.

Q. *Every time I start* Windows, *my group and program icons aren't arranged the way I last left them, even though I click the Save Changes box when I exit. What's up?*

A. The secret is to turn off a function in the Program Manager's Options menu and to know when to 'Save Changes'—and when not to.

If your program icons won't stay put, you probably have Auto Arrange checked in the Program Manager's Options menu. Uncheck it. Arrange the program icons as you wish, and exit *Windows* with the Save Changes option checked.

The order of group icons at the bottom of the Program Manager window is affected not by Auto Arrange but by the order in which you last touched the icons. Simply click the group icons in the order in which you want them to appear left to right, and exit *Windows* with Save Changes checked. The next time you start *Windows,* the icons will be laid out in apple-pie order. To preserve the order of both your program and group icons, *uncheck* the Save Changes box until you need to create a new arrangement.

Q. *I've been running* Windows *in enhanced mode on my 386 but was recently told that standard mode is faster. Is that true?*

A. Don't believe everything you hear. Running *Windows* in standard mode *may* be faster, but only if you meet two conditions:

1. You are running only *Windows* applications. If you want to run DOS applications in the background or in windows, you must use enhanced mode.

2. You have enough RAM to hold all your running applications. Enhanced mode gives you access to *virtual memory,* a scheme that treats a hard disk like RAM if *Windows* runs out of the real McCoy. Standard mode can only

(continues)

Windows Toolbox

Recorder Run lets you assign any Recorder macro to an icon, in this case the icon that represents the Main window; double-clicking the icon executes the macro. Recorder Run $30; e-Image, 10342 107th St. #218, Edmonton, Alberta, T5J 1K2 Canada. Reader service no. 697

ANTHONY RUSSO

Wrong.

"you need look no further than *FoxPro*, Version 1.02.

This $795 database from Fox Software has succeeded *dBASE* as the industry leader in innovation, power, and speed—a winning combination t'"

–PC Magazine 5/28/91

Write.

Don't get us wrong –we love the quote. And FoxPro 1.02 really was that good.

But we've just released FoxPro 2.0. And it's more innovative, more powerful, and far, far faster.

You'll have to write (or call) for details, but here are some of the highlights:

In tests against IBM's DB2 on a mainframe, FoxPro on a PC was 4 times faster querying a million-record, 200 megabyte database.

PC MAGAZINE EDITORS' CHOICE

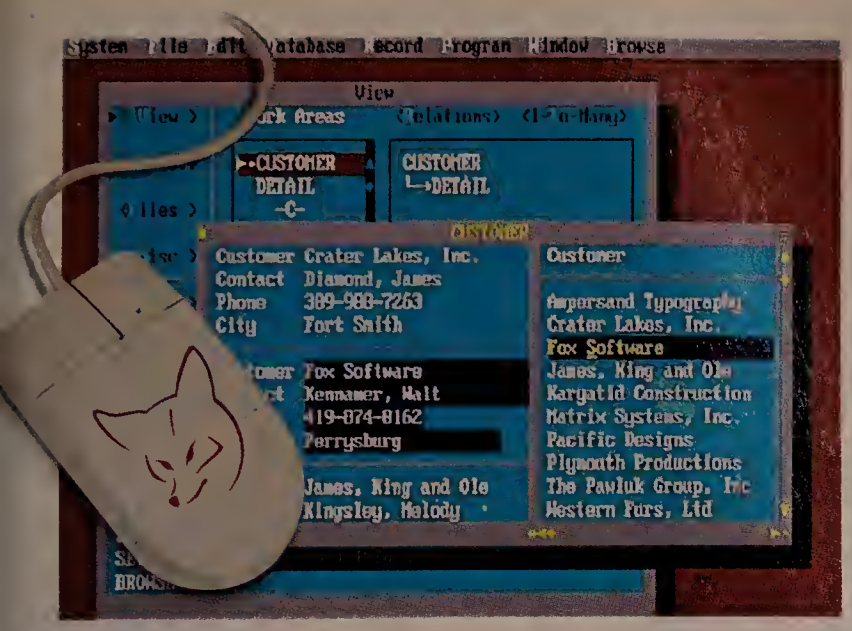
And against other PC database management systems like dBASE and Paradox, it's devastating, thanks to our patent-pending Rushmore™ query optimization techniques.

The DBMS that acts like a Mac and runs like a mainframe. In DOS.

On top of its state-of-the-database-art performance, FoxPro 2.0 with its CUA-like interface gives you the ease-of-use of a Graphic User Interface (GUI) on your character-based DOS PCs.

You use pulldown menus to open multiple windows you scroll through, reposition and resize using keyboard shortcuts or a mouse.

Our Fourth Generation Language (4GL) tools make screens, menus, reports and labels a snap. Create your own custom data entry and viewing screens just by picking-and-clicking to position data, buttons, check boxes and scrolling lists



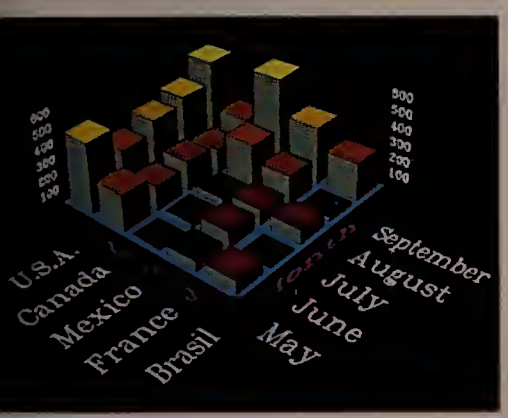
anywhere you want them. Then assemble everything into your own custom applications without writing a single line of programming code.

But that's only the tip of the iceberg.

Our new demand paging memory management works with the memory you have now while speeding up your single-user and networked applications.

Our new compound indexes are as small as a quarter the size of those in competitive products and far, far faster.

Our new Relational Query-By-Example (RQBE) is a simple, interactive interface to the information you need. Unlike other query systems, RQBE lets you browse the answer table, or create an instant database, report, labels or a business graph (with our optional FoxGraph or other graphic program).



Behind its friendly exterior, RQBE creates an efficient SQL SELECT statement you can add seamlessly to any of your applications. And do the same with our new SQL INSERT and CREATE TABLE commands, too.

We've added over a hundred new and enhanced commands and functions, including one-to-many-to-many relations, new array handling, and a BROWSE FOR command that could be the basis for an entire application itself.

We've added a new project manager that keeps track of all the needed files and any changes then automatically builds your applications (and EXE files with our optional Distribution Kit). And an API (Application Program Interface) that lets you dynamically link to libraries written in C or assembler (Library Construction Kit optional) using a single FoxPro command.

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Circle 76 on reader service card

swap segments of an application to disk. If you see a sudden increase in hard disk activity in standard mode, you've RAMmed up against the wall; switch to enhanced mode to speed up operations.

If you satisfy both conditions, you may see a 5 percent to 20 percent performance improvement in standard mode.

Q. *I have a 386 with 8MB of RAM, yet my machine crashes when I run three programs with* PageMaker. *How can that be?*

A. You're not running out of RAM but out of *system resources.* System resources are two special 64K segments of memory that *Windows* uses to handle keyboard input, windows, dialog boxes, and more. Every time a program does something—opens a window, downloads a file—*Windows* must track it. That's why a single program that's opening many windows can tax system resources as much as four programs running at the same time would.

To check *Windows'* resource thermometer, open the Help Menu in the Program Manager and select *About Program Manager.* You'll see readings for 'Free Memory' (RAM) and 'Free System Resources' in percentage remaining. To determine if a program is a resource hog, note the amount free before and after loading it. Most users report problems whenever the percentage hovers around 20 or less.

You can free up some system resources by not using wallpaper, closing group windows in the Program Manager, and closing unneeded document windows within applications.

Q. *I'm exploring the Advanced Options PIF screen, trying to fine-tune the multitasking of DOS programs. What numbers should I use for Background Priority and Foreground Priority?*

A. The numbers you use are arbitrary. What matters is how they relate to the numbers assigned to other applications running at the same time. For instance, if you have three applications running with priorities of 100, 100, and 200, you have a total of 400. The application with the priority of 200 would receive 200/400, or 50 percent of the processor time. If an application is running too slowly, simply increase its number.

Send your questions to Windows Workshop, PC World, *501 Second St. #600, San Francisco, CA 94107; CompuServe 74055,412; MCI Mail 179-3813; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge submitted materials.*

Jesse Berst is a PC World *contributing editor. He and Scott Dunn are co-authors of* 101 Windows Tips *(Peachpit Press, Berkeley, California, 1991).*

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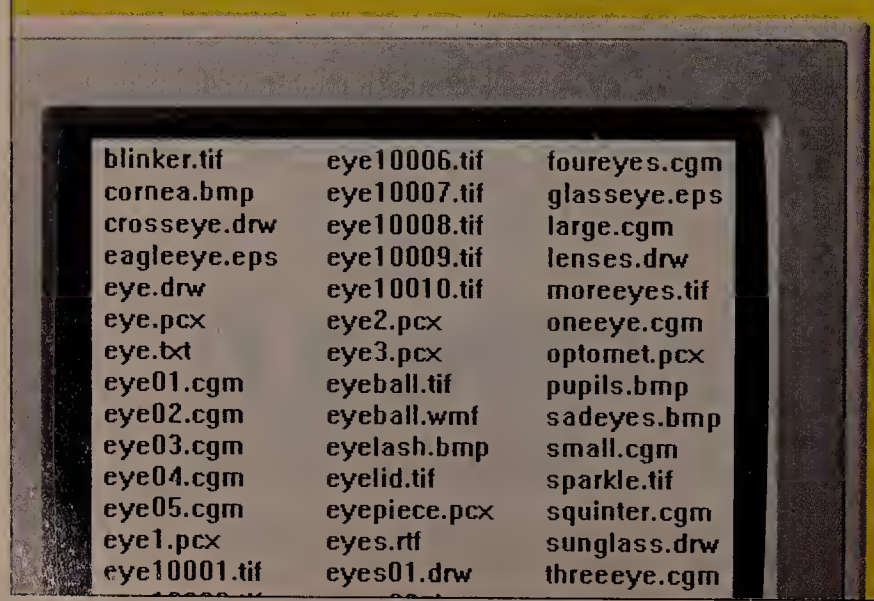
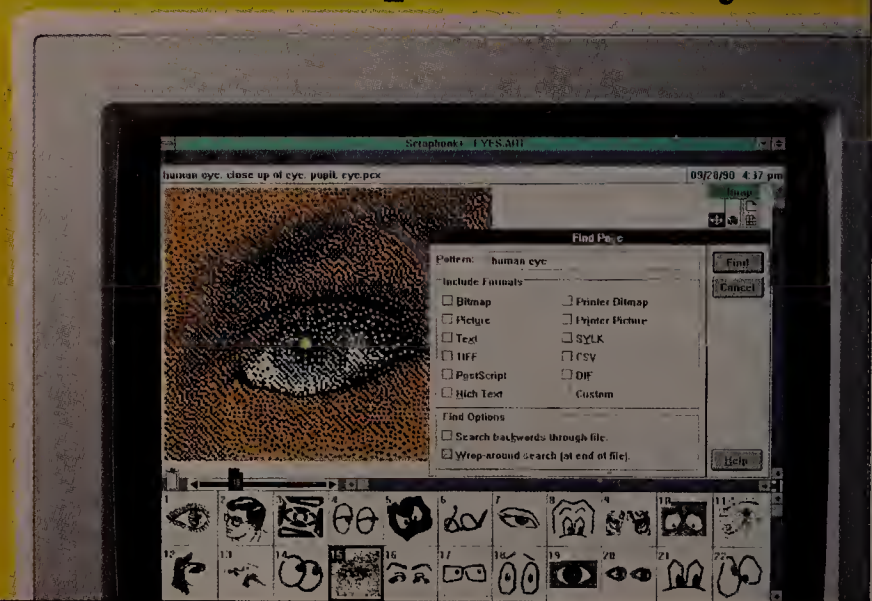


The Scrapbook+ way.



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Computer Users...

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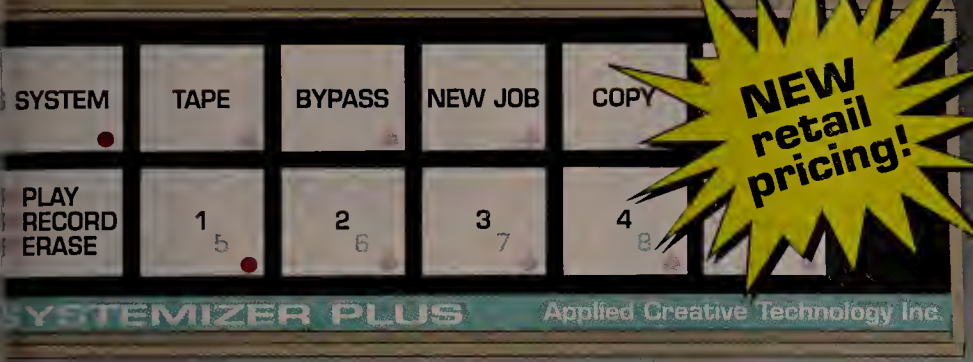

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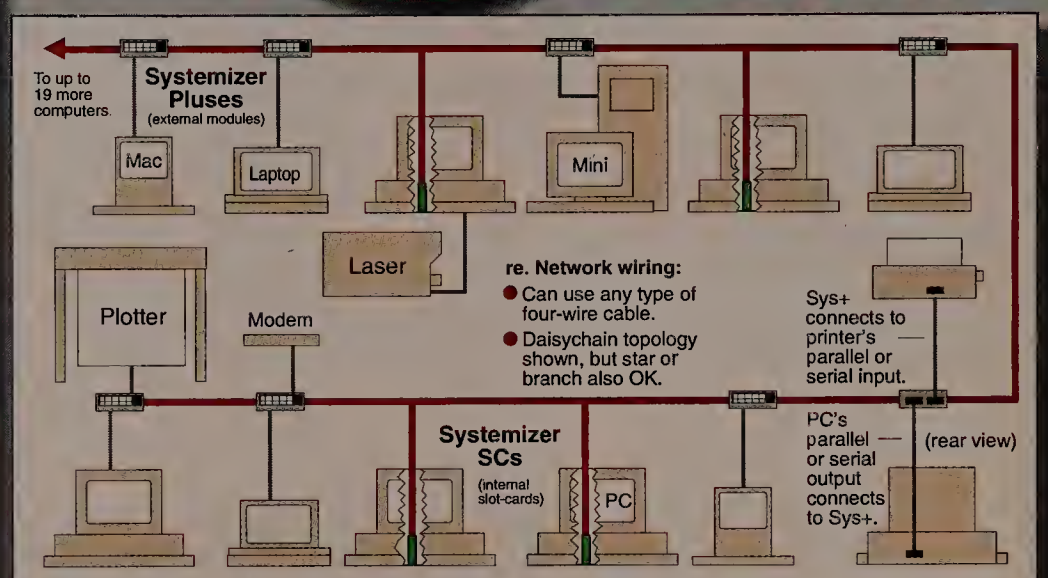

Example Systemizer® network consisting of 11 micros *and* a minicomputer, sharing 3 printers and a modem via a mixture of Systemizer Pluses and Systemizer SCs. Note: though not shown here, some of the computers could also be connected to a traditional LAN or WAN.

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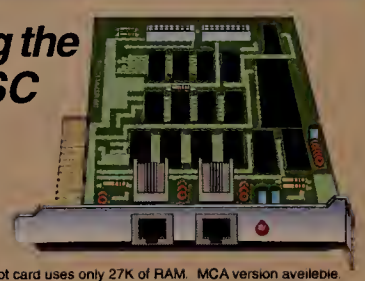

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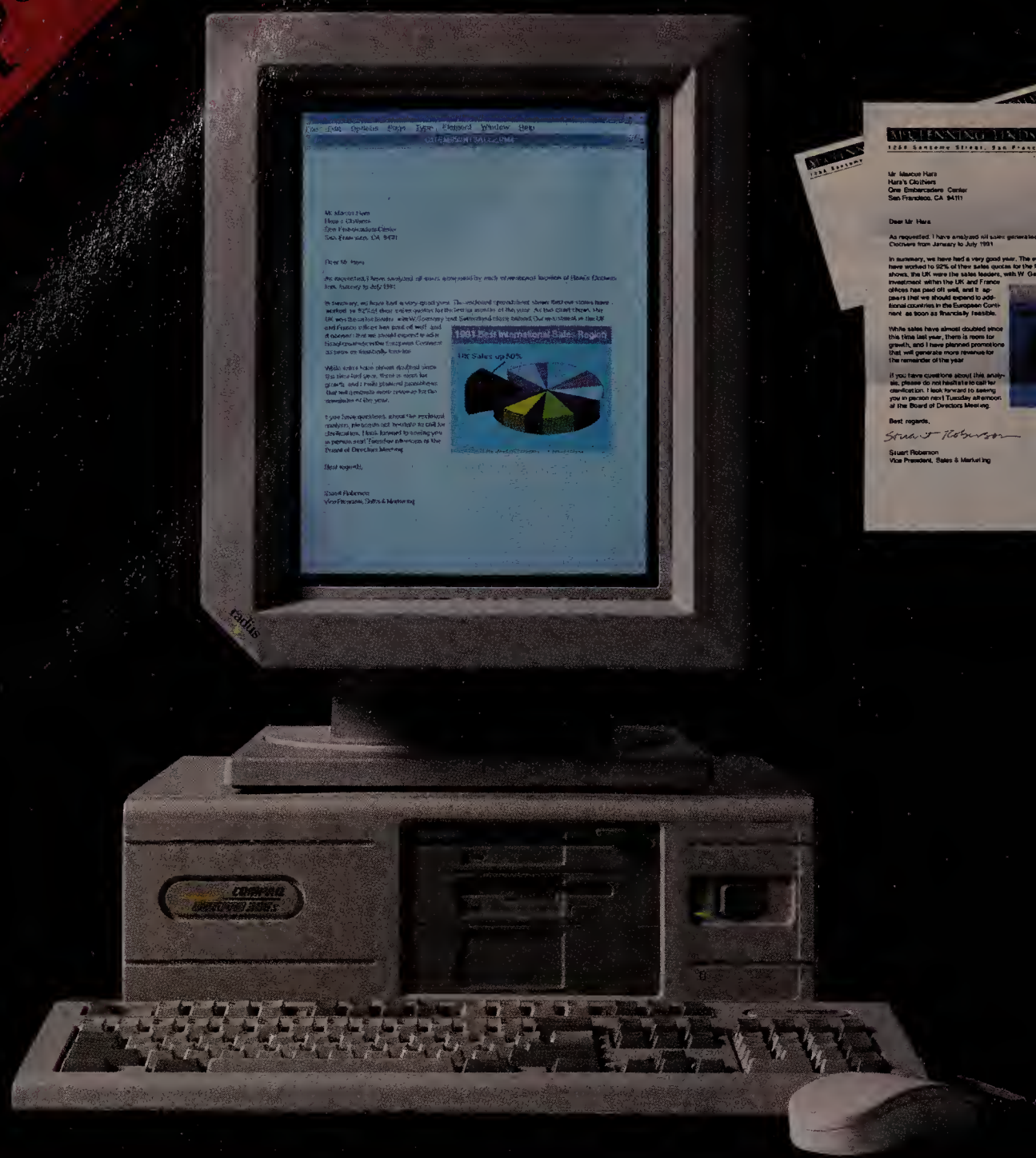

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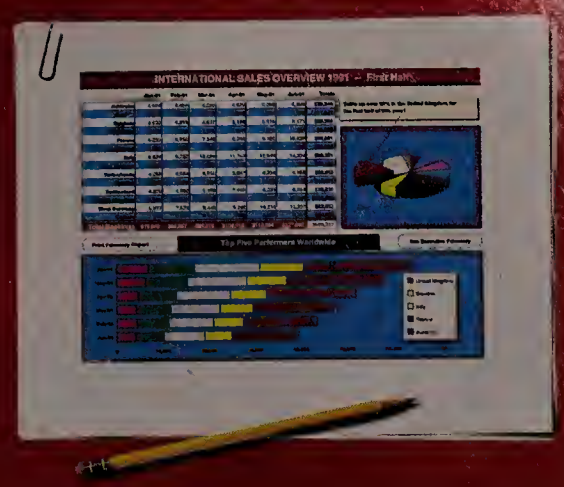

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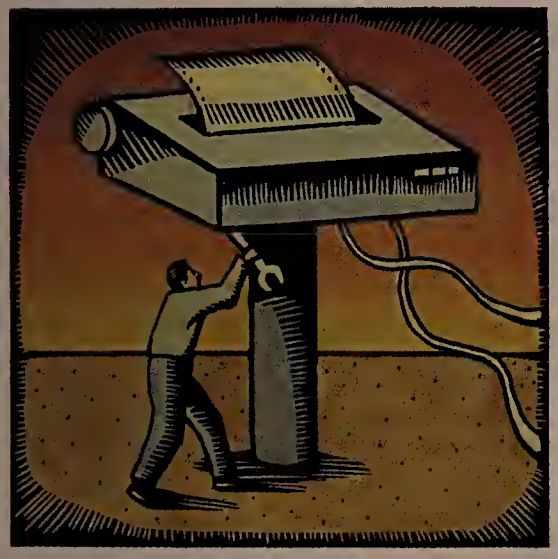
USER GROUP TIPS

Helpful hints from members of the nation's user groups



RANDY LYHUS

Clean Pins for Sharp Dot Matrix Output

You have to get an urgent report to your boss first thing in the morning, but when you print it out on your dot matrix printer at home, you notice the letters look as faint as the Dead Sea Scrolls. Even after you put in a fresh ribbon, the image appears uneven. You're probably facing the most common problem of dot matrix printers—waxy buildup of dried ink and paper dust. Don't despair. You can clean away the difficulty with a few common supplies.

Start by unplugging the printer; remove the paper and ribbon, and take out the printhead. Then put some VCR head-cleaning solution on a foam swab or a fine, synthetic sponge. Don't use a cotton swab, paper towel, or similarly fibrous material, because you could easily damage the printing wires. Apply the swab gently to the printhead's wire pins. Rub gently to dislodge surface residue. Then place a drop of the solution on the pins and let it run down the pins' tubes to dissolve ink buildup.

When the printhead is dry, apply a drop of very light oil (the kind used in watch repair) to the tips of the pins. Allow the oil to run down the shafts of the pins to lubricate them and keep ink from building up. Do this over an impermeable surface; drips will stain.

Don DuPuy
Memphis PC Users Group

IF-y WordPerfect Merges

WordPerfect's {IF BLANK} and {IF NOT BLANK} merge codes are useful if you want *WordPerfect* to print additional information when a field is empty. But they can't read a field's contents. If you want your merge document to perform operations based on the field's contents, use {IF}expr~ to compare string expressions and perform one action if the expression is true and another if it's false. Enclose the strings—including field names and associated tildes—in quotation marks.

You can test whether one string is equal to (=), not equal to (!=), greater than (>), or less than (<) another string. For example, to test whether the contents of a field called State are equal to "CA", you select {*IF*}*expr*~ from the list of merge codes, type **"{FIELD}State~" != "CA"** and press **<Enter>**. Then select {*NEXT RECORD*} and finally {*END IF*} from the list of merge codes. If *WordPerfect* doesn't find "CA" in the current record's State field, it skips to the next record.

Keneth J. Hopkins
Sacramento PC Users Group

Being Discrete Made Easy

After you download compressed ZIP files from a BBS, expand each into its own directory to keep the bevy of files making up single programs separate from other files. If you download in bunches, however, this process gets tedious. This batch file saves keystrokes. It creates a subdirectory under the directory that contains the ZIP file, gives it the same name as the ZIP file, and decompresses the ZIP file into it. Name it UNZIP.BAT, and save it in a directory listed in your system's PATH command. In this example, PKUNZIP.EXE resides in the C:\ZIP directory.

```
@echo off
md %1
cd %1
c:\zip\pkunzip ..\%1
cd..
```

To decompress, say, BALLGAME.ZIP, enter **unzip ballgame** at the DOS prompt in the directory containing BALLGAME.ZIP.

Jason August
Mile-High User Group
Englewood, Colorado

Are you a user group member with a tip to share? Send it to User Group Tips, PC World *501 Second St. #600, San Francisco, CA 94107; CompuServe 74055,412; MCI Mail PC World Editorial; or 415/442-1891 (fax)—include your phone number and the name of your group. We pay $50 and throw in a* PC World *T-shirt for each tip we use—and you get to see your name in* PC World.

ANTHONY RUSSO

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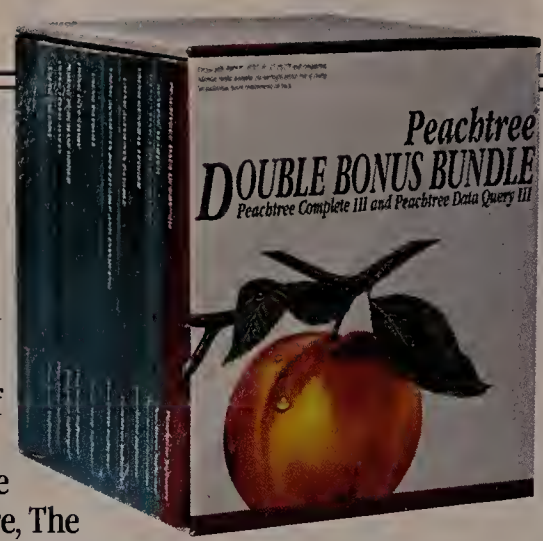

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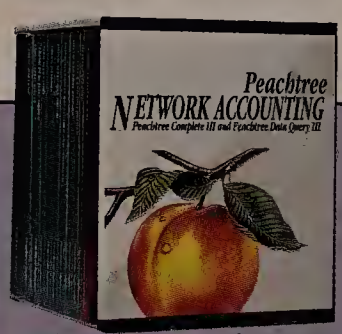

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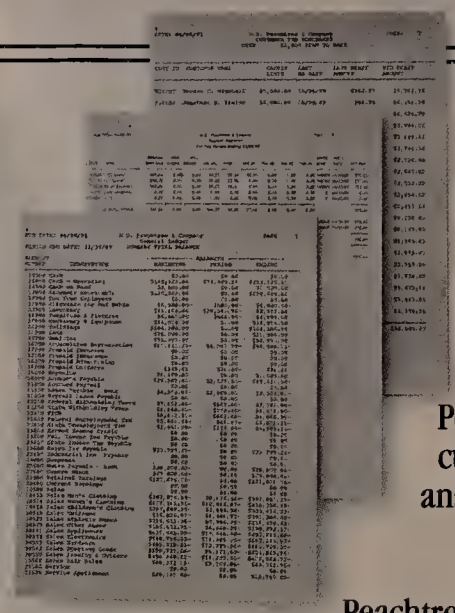

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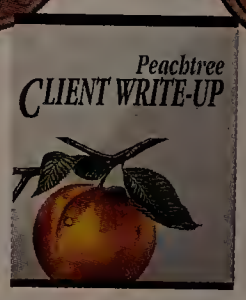

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Edited by Brett Glass

1-2-3 Menu Magic

I make heavy use of *1-2-3* and am surprised that few people take advantage of the AUTO123.WK*x* spreadsheet file, which if stored in the global default directory (type **/WGDD**; enter the drive letter, a colon, and the directory; and type **UQ**), loads automatically when you start *1-2-3*. I use this worksheet as a file-retrieval menu (see **FIGURE 1**); after loading *1-2-3*, all I need to do is press an <Alt>-*letter* key combination to invoke the worksheet file of my choice.

Here's how this menu works: Column A contains easily changed parameters for the file-launching macros; column B identifies, in an easily readable form, the keystrokes needed to run the macros; column C describes what the macros do; column D names the macros for the benefit of *1-2-3*'s Range Name Label command; and column E contains the actual macro instructions.

Most of the macros don't use column A, but occasionally it comes in handy. Note, for instance, the File Server macro in row 7. Cell A7 contains the name of a file server subdirectory from which you might want to retrieve files. To open a file in the F:\ACCOUNTS subdirectory, for instance, you would merely change the A7 label to read **ACCOUNTS**, then press **<Alt>-F**. If A7 contains a number, the macro converts it to a string to make it a legal directory name.

Because I make frequent changes to this spreadsheet, I added a macro—invoked by **<Alt>-S**—that easily saves the file. This spreadsheet makes retrieving *1-2-3* files a breeze.

Jeff S. Hoffmann
Savage, Minnesota

Editor's note: This simple idea can be extended to provide all sorts of useful start-up menus. For instance, you can use 1-2-3*'s date functions to create items for "this month's budget," "last week's report," and so forth, and the spreadsheet can automatically find the file that corresponds to the appropriate day, week, or month (I added cells A5..E5 to demonstrate this technique). If you're creating the menu for other users, move the contents of columns D and E outside the visible portion of the worksheet to give the screen a more polished look.*

FIGURE 1 *doesn't accurately show the macro formulas themselves, some of which are too long to be displayed properly in this format. See* **LISTING 1** *for the correct macro formulas, listed by cell address. After you've entered the macros, press /, select* Range Name Label Right, *enter the range* **D3..D11**, *and press* **<Enter>** *to name the ranges. The macros listed reflect Mr. Hoffmann's drive and directory structure; you'll want to alter them to match yours. The possibilities are limited only by your imagination and macro-writing skills.*

Drawing a Blank in a Batch File

The DOS ECHO command doesn't provide any obvious way to display a blank line. But there's a simple solution to the problem: On a blank line in your batch file, type **ECHO**, press **<Space>**, then hold down the **<Alt>** key as you type **255** on the numeric keypad. When you release the **<Alt>** key, the cursor will move as if

(continues)

	A	B	C	D	E	F
1	Parm	Key	Function	Keycode	Macro	
2	----------					
3		Alt-A	Floppy A:	\A	/FR{ESC}{ESC}A:\~	
4						
5		Alt-B	Monthly Budget	\B	/FRC:\BUDGETS\91\10~	
6						
7	WORK	Alt-F	File Server	\F	/FR{ESC}{ESC}F:\WORK\~	
8						
9		Alt-P	Personal	\P	/FRPERSONAL\~	
10						
11		Alt-S	Save this menu	\S	/FS~R	
12			after changing			
13						

FIGURE 1: AUTO123.WK1—or .WK3—offers you a menu of file-loading choices when you enter 1-2-3. See LISTING 1 for the full macros.

ANTHONY RUSSO

```
E3:   '/FR{ESC}{ESC}A:\~
E5:   +"/FRC:\BUDGETS\"&@STRING(@YEAR(@NOW),0)&"\"&@STRING(@MONTH(@NOW),0)&"~"
E7:   +"/FR{ESC}{ESC}F:\"&@IF(@ISNUMBER(A7)=1,@STRING(A7,0),A7)&"\~"
E9:   '/FRPERSONAL\~
E11:  '/FS~R
```

LISTING 1: When creating AUTO123.WKx, type the characters shown here into their respective cell addresses.

you'd just typed a space. But when you run your batch file, a blank line will appear.

This technique also lets you ECHO the words *on* and *off*, which would normally be interpreted by the command processor as part of the command. You simply type **ECHO**, press the <Space> bar, type **<Alt>-255**, then type **ON** or **OFF**. But I still haven't figured out how to ECHO a < or > character without getting a 'File not found' error message.

G. F. Christiann
Ft. Lauderdale, Florida

Editor's note: This trick relies on the fact that the line you're displaying isn't really blank; it contains ASCII character 255, which just happens to appear on screen as a blank. You can also use ECHO followed immediately by a period to make a batch file display a blank line.

As for displaying the < and > characters—you can't use the ECHO command to show them by themselves, but you can ECHO them as part of a string enclosed in double quotes. In other words, **ECHO >** *won't work, but* **ECHO ">"** *will. The double quotes will appear along with the string, which looks ridiculous by itself, but is fine if you're describing a command, as in* **ECHO TYPE "TYPE filename > PRN"**.

Getting to the Bottom of ObjectVision

By using *ObjectVision*'s multiple file linking and decision trees, I'm able to create great-looking applications in no time. However, the program's default navigation buttons aren't sufficient for many applications.

Here's a solution I've found useful when working with *ObjectVision* applications linked to *Paradox* and *dBASE* files. When you link to a file, you get five default buttons: Previous, Next, Clear, Delete, and Enter. When you open a form, *ObjectVision* doesn't know where in the data base it is, and pressing *Next* or *Previous* will only confuse it.

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The best way to solve this problem is to add two more buttons, **Top** and **Bottom**, to position you quickly at the beginning or end of the data base. First, use the Objects Field command to create two fields called **Top** and **Bottom**. I recommend positioning them near the default buttons and making them the same size and shape. Then, turn these new fields into buttons by selecting *Properties Field type Button.*

Next, attach decision trees to the buttons: Double-click on one of the new buttons to bring up an empty decision tree. Select *Object Conclusion.* For the Top button, enter the conclusion **@TOP("***linkname***")**; use **@BOTTOM("***linkname***")** for the Bottom button. For both of these, *linkname* is the name you created earlier for the link using the Tools Link Create command. From then on, these buttons will take you to the first and last records of the data base.

Richard Reiter
Aptos, California

Editor's note: While this technique will let you get to the top or bottom of the data base, you may not find what you're looking for there. Remember, relational data bases don't necessarily keep their records in any predefined sequence; thus, the first and last records in the data base may not be the first or last in alphabetical order.

Seeing Things Sideways Through Windows...

I'd always been disappointed that my HP DeskJet printer doesn't have a built-in landscape mode, which comes in handy when working with wide spreadsheets. Then I discovered that *Windows* provides me with this capability—at least when I print from *Windows* applications.

To use this feature, select *File Printer setup* from inside a *Windows* application, or *Printers* from the Control Panel. Next, select a printer (I select *HP DeskJet Family on LPT1:*), then click the *Setup* button (if you're working from the Control Panel, you have to click *Configure* and then *Setup*). Select *Landscape* as the orientation.

Now you can use *Windows'* Modern, Script, and Roman fonts while printing in landscape. I use this technique with *Excel, Word for Windows,* and other applications.

Michael Csontos
Bridgeport, Connecticut

Editor's note: The DeskJet isn't the only printer that can use this trick. Any graphics printer will work in landscape mode under Windows *if the driver supports it. And you're not limited to* Windows' *standard fonts if you have* Adobe Type Manager, *Bitstream's* FaceLift, *or another* Windows *font-scaling program.*

...And Through dBASE

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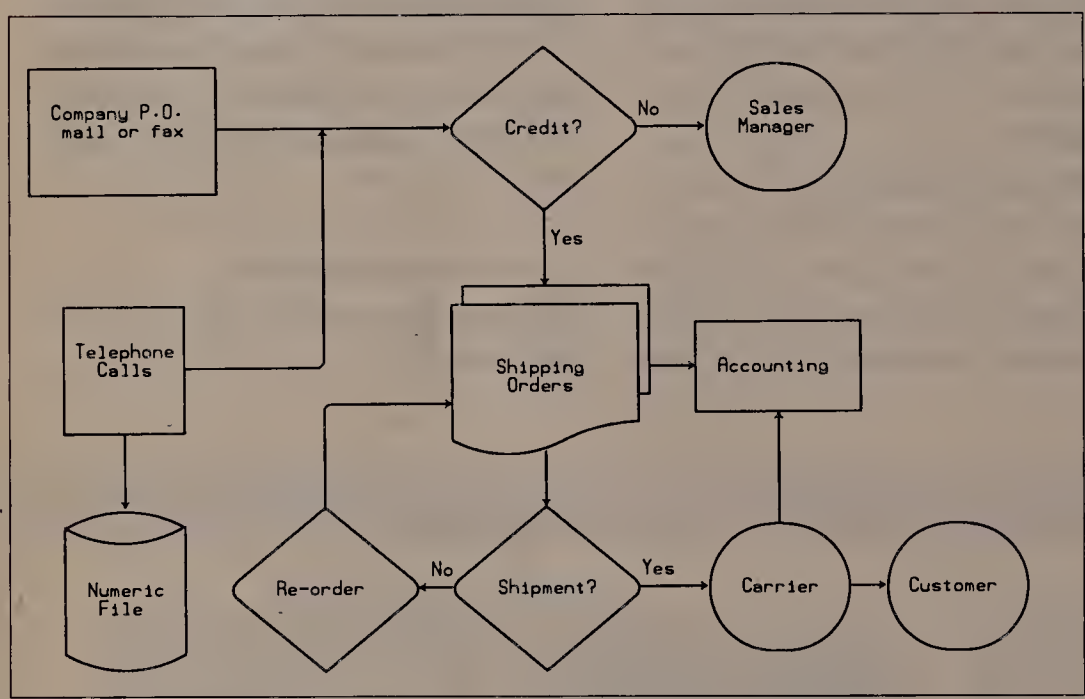

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dBASE files sideways? I do it by turning my DBF data into a spreadsheet file: From the *dBASE IV* Control Center, select *Tools Export WKS* and pick the file you wish to export. It will be turned into a *1-2-3* release 1 WKS file that any spreadsheet program can read. Programs like *Sideways* and *Twist and Shout*, intended for printing worksheets sideways, can also read and print these files.

Thinh Ly
Los Angeles, California

Editor's note: There's another way to turn DBF data into WKS files, and it can be done in dBASE III Plus, FoxPro, *and most other dBASE-language (continues)*

POWER TIP NO. 216

A Clipboard Substitute for WordStar

When editing a document with *WordStar*, you might want to delete a sentence or paragraph and then reinsert it later on. But *WordStar*'s undelete buffer holds only the last deletion greater than a single character. Fortunately, any version from *WordStar 5.0* on lets you open a second window, which can be used as a clipboard. Just mark the block you want to save, press **<Ctrl>-OK**, enter **clip** (or another name for your temporary file), and press **<Ctrl>-KA** to copy the block into the new file. Now press **<Ctrl>-OK<Ctrl>-KY** to return to your working file and delete the block. When you're ready to reinsert it, just copy the block from the clipboard back to the original file.

Rex Farrance
Assistant Editor

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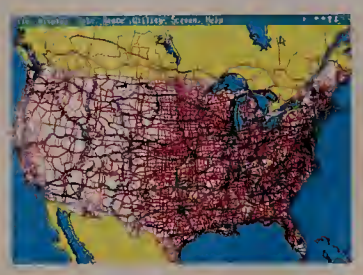

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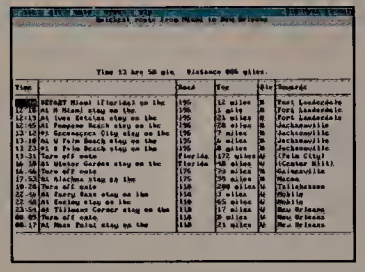

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products. With the file in question open, use the command **COPY TO** filename.**WKS**.

Any program that can produce a 1-2-3-compatible spreadsheet file should be able to use this technique. But beware: Most export facilities make column widths considerably narrower than they need to be. Thus, a cleanup in 1-2-3 isn't just an option, it's a necessity.

Brett Glass is a contributing editor for PC World.

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POWER TIP NO. 217

Making a Date With WordPerfect

With *WordPerfect 5.0* or *5.1*'s Date Code feature, you can set up a one-keystroke macro to insert the current date in a document. Just press <**Ctrl**>-<**F10**> to begin recording. Press <**Alt**>-**D**, type **Insert Date**, and press <**Enter**>. Press <**Shift**>-<**F5**>**c** to insert the current date, then <**Ctrl**>-<**F10**> to end recording.

Now simply pressing <**Alt**>-**D** will insert the current date in a document. If you reprint the document or use it as a template for other documents, the date will always be current.

George Campbell
Contributing Editor

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Instant Reference Card #17

For use with PC World Instant Reference Card Portfolio

BASICS: QUATTRO PRO 3.0

What to do: You open a menu using the mouse (point to the menu name with the mouse pointer and click the left mouse button) or the keyboard (press / and then the menu's highlighted letter, shown here in bold; or press /, use the cursor keys to highlight the menu name, and press **<Enter>**). Select a menu option using any of those three ways, but don't press /.

GETTING STARTED

Create new file	**/File New**
Open existing file	**/File Open**, select/type name
Save file	**/File Save** or **<Ctrl>-S**
Save file with new name	**/File Save as**, select/type name
Close file and window	**/File Close**
Print spreadsheet	**/Print Block**, select area, **Spreadsheet print**
Get help	**<F1>**
Return to last help screen	**<Backspace>**
Leave help	**<Esc>**
Leave *Quattro*	Save all files, then **/File Exit**

GETTING AROUND

Move right/left one screen	**<Ctrl>-<Cursor Right>** or **<Tab>**/ **<Ctrl>-<Cursor Left>** or **<Shift>-<Tab>**
Move up/down one screen	**<Page Up>**/**<Page Down>**
Go to first cell next to blank cell up/down/right/left	**<End><Cursor Up>**/**<Cursor Down>**/**<Cursor Right>**/**<Cursor Left>**
Go to last nonblank cell	**<End><Home>**
Go to cell A1	**<Home>**
Go to specified cell	**<F5>**, type cell address/name
Go to next pane	**<F6>** or click on another pane
Go to next window	**<Shift>-<F6>**

ENTERING INFORMATION

You can enter two kinds of information: *values*, which are numbers and formulas, and *labels*, which include text and everything else. Begin a value with a number or an arithmetic sign.

Enter left-aligned label	Begin with ' (apostrophe)
Enter right-aligned label	Begin with "
Enter centered label	Begin with ^
Enter label repeated to fill cell	Begin with \
Enter label hidden when printed	Begin with |
Display list of block names	**<F3>**
Display list of functions	**<Alt>-<F3>**
Display list of macro commands	**<Shift>-<F3>**
Make address absolute	Enter address, **<F4>** (keep pressing **<F4>** for variations)

EDITING A CELL

Start editing	**<F2>**
Complete editing	**<Enter>**
Erase edit area	**<Esc>** or **<Ctrl>-<Backspace>**
Stop editing and discard changes	**<Esc><Esc>**
Delete character at cursor	**<Delete>**
Delete character to the left	**<Backspace>**
Delete all characters to the right	**<Ctrl>-**
Go to left/right end of entry	**<Home>**/**<End>**
Go five characters left	**<Shift>-<Tab>** or **<Ctrl>-<Cursor Left>**
Go five characters right	**<Tab>** or **<Ctrl>-<Cursor Right>**
Toggle insert/overtype modes	**<Insert>**

WORKING WITH BLOCKS

A block is a rectangular set of cells that can be a single cell, a row, a column, or an area that contains several rows and/or columns. You identify a block by two cells in opposite corners of the block. You should move the cell pointer to one of those corners before issuing a command that affects or uses that block.

Specify block with the keyboard	Move to corner cell, **<Shift>-<F7>**, move to opposite corner
Specify block with the mouse	Press and hold left mouse button while dragging from one corner to the other
Copy block	**/Edit Copy** or **<Ctrl>-C**, specify source block, specify destination block
Move block	**/Edit Move** or **<Ctrl>-M**, specify source block, specify destination block
Erase block	**/Edit Erase** or **<Ctrl>-E**, specify block; or specify block with **<Shift>-<F7>** and press **<Delete>**
Set width of column(s) in block	**/Style Block size Set width**, specify block, set width
Set height of row(s) in block	**/Style Block size Height**, specify block, set height in points
Define block name	**/Edit Names Create**, type name, specify block
Delete block name	**/Edit Names Delete**, select name
Use labels for block names	**/Edit Names Labels**, select position of cells to be named, specify labels block
Fill block with series of values	**/Edit Fill**; specify block, start of series, increment, and end of series

Tip: After specifying a block, you can press **<Period>** to move the cell pointer to another corner of the block, and then use the cursor keys to change the block's size.

HANDLING FILES

Tip: With the **File Open** command, you open a file in a new window. You can have 32 windows open. With the **File Retrieve** command, you open a file in the current window, replacing the current spreadsheet in that window.

Retrieve file into current window	**/File Retrieve**, select/type path/file name
Save all open spreadsheets	**/File Save all**, select/type paths/file names as necessary
Close all open windows	**/File Close all**
Combine file with current file	**/Tools Combine Copy File/Block**, type address/block name, select/type path/file name
Add/subtract file to/from current file	**/Tools Combine Add/Subtract File/Block**, type address/block name, select/type path/file name
Import text or delimited files	**/Tools Import ASCII text/Comma & ""/Only commas**, select/type path/file name

Note: *Quattro* can read *1-2-3*, *Symphony*, *dBASE*, *Paradox*, and *Reflex* files.

Change the default directory	**/Options Startup Directory**, type directory path
Change the current directory	**/File Directory**, type directory path

Tip: To see a screen of file names before selecting one, press **<F3>** when prompted to select a file. To search for a file when prompted to select a file, press **<F2>** and type the first couple of letters of the file name.

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ADVANCED: QUATTRO PRO 3.0

WORKING WITH WINDOWS

Tip: A given spreadsheet file can be in only one window at a time. To display two parts of the same spreadsheet, split a window into two panes.

Split window into two panes	Position cursor at split, **/Window Options Horizontal/Vertical**
Sync/unsync scrolling panes	**/Window Options Sync/Unsync**
Remove second pane	**/Window Options Clear**
Select different active window	**/Window Pick** or **<Shift>-<F5>**, select window
Size window	**/Window Move/size** or **<Ctrl>-R**, **<Scroll Lock>**, use cursor keys; or click and drag lower right corner of window
Move window	**/Window Move/size** or **<Ctrl>-R**, use cursor keys; or click and drag title bar
Overlap all open windows	**/Window Stack**
Tile all open windows	**/Window Tile** or **<Ctrl>-T**
Expand active window to fill screen	**/Window Zoom** or **<Alt>-<F6>**, or click arrows on right side of menu bar

CHANGING A SPREADSHEET

Undo last change	**/Edit Undo** or **<Alt>-<F5>**
Delete row(s)/column(s)	**/Edit Delete Rows/Columns**, select row(s) or column(s)
Erase current spreadsheet	**/File Erase Yes**

Fold Here

Recalculate spreadsheet	**<F9>**
Set width of column	**/Style Column width** or **<Ctrl>-W**, specify width
Insert row(s)/column(s)	**/Edit Insert** or **<Ctrl>-I**, **Rows/Columns**, select row(s)/column(s) to be inserted
Search and replace text, values, or formulas	**/Edit Search and replace**, select and enter options
Transpose rows and columns	**/Edit Transpose**, specify source block, specify upper left destination cell
Change formulas to numbers	**/Edit Value**, specify source block, specify destination block
Freeze rows/columns	Position cursor below and to right of area to freeze, **/Window Options Locked titles Both/Horizontal/Vertical**
Unfreeze rows/columns	**/Window Options Locked titles Clear**
Hide columns	**/Style Hide column Hide**, select columns
Display hidden columns	**/Style Hide column Expose**, select columns

FORMATTING

Align labels and values	**/Style Alignment** or **<Ctrl>-A**, **General/Left/Right/Center**, specify block
Format numbers and formulas	**/Style Numeric format** or **<Ctrl>-E**, select type, enter number of decimal places, select block
Change font used for printing	**/Style Font**, select font, specify block
Change the fonts available	**/Style Font Edit fonts**; select font to redefine; select typeface, point size, and style
Add shading to block	**/Style Shading Grey/Black/None**, specify block
Draw lines around block	**/Style Line drawing**, specify block, select placement, select type

PRINTING A SPREADSHEET

Select block to print	**/Print Block**, specify block
Select heading for each page	**/Print Headings Left/Top**, specify columns or rows
Change print margins	**/Print Layout Margins Left/Top/Right/Bottom**, type margin
Change margin units	**/Print Layout Dimensions Inches/Centimeters/Lines/characters**
Enter header/footer	**/Print Layout Header/Footer**, type header/footer
In a header/footer	Use **@** for date, **#** for page, or **|** for section (left, center, or right)
Change orientation	**/Print Layout Orientation Portrait/Landscape/Banner**
Set number of copies	**/Print Copies**, enter number
Choose destination/preview	**/Print Destination Printer/File/Binary file/Graphics printer/Screen preview**
Begin printing	**/Print Spreadsheet print**
Size data to fit on one page	**/Print Print to fit**

WORKING WITH GRAPHS

Select type of graph	**/Graph Type**, select type
Select data to plot	**/Graph Series**; select a series, specify its block, repeat for remaining data
Select x-axis labels	**/Graph Series X**-axis series, specify block
Add titles to graph	**/Graph Text**, select placement, type title
Add legend	**/Graph Text Legends**, select series, type text/address proceeded by \, select position
Display current graph	**/Graph View** or **<F10>**

Fold Here

Name and store graph	**/Graph Name Create**, type name
Use different graph	**/Graph Name Display**, select name
Print current/named graph	**/Print Graph print Name**, select/type name of graph, **Go**
Paste graph onto spreadsheet	**/Graph Insert**, select/type nome of graph, specify block on spreadsheet
Remove graph from spreadsheet	**/Graph Hide**, select/type name of graph
Copy graph from one spreadsheet to another	**/Graph Name Graph copy**, select graph, select spreadsheet

WORKING WITH A DATA BASE

Sort data base or block	**/Database Sort Block**, specify block, select and specify key, **Ascending/Descending Go**
Extract records from data base	**/Database Query Block**, specify block, **Output** block, specify block, **Criteria** table, specify block, **Extract**
Locate records in data base	**/Database Query Block**, specify block, **Criteria** table, specify block, **Locate**
Delete records in data base	**/Database Query Block**, specify block, **Criteria** table, specify block, **Delete**
Repeat last extract/locate	**<F7>**

LINKING TO OTHER FILES

Link to named cell in external spreadsheet file	To reference cell TAX in C:\BUD\QTR1.WQ1 use **+[C:\BUD\QTR1.WQ1]TAX**
Sum TAX field in open files QRT1, QRT2, QRT3, and QRT4	**@SUM([QRT?]TAX)**
Sum TAX field in all open files	**@SUM([*]TAX)**
Extract from external data base	**/Database Query Block**, type [*path\filename*]range, **Output** block, specify block, **Criteria** table, specify block, **Extract**

Note: An external file is any file other than the one you are currently working on; it may be on disk or in memory.

For use with PC World Instant Reference Card Portfolio

DEVELOPER'S TOOLBOX

Add Zip to Your Data

Brett Glass

The only thing growing faster than the capacity of hard disks is the amount of data most people need to put on them. As a programmer, you'll receive kudos from your users if your masterpiece doesn't contribute to the data glut—and one of the best ways to do that is to build data compression into your program. But which algorithm should you choose? And how do you make sure it really works?

PKware's *Data Compression Library* comes to the rescue by letting you use one of the time-tested algorithms from the same company's popular PKZip and PKUnzip utilities. While this library's routines won't work on PKZip files and aren't designed to compress executables for expansion at runtime (PKware has another product, *PKLite*, for that job), they're ideal for your program's own data files and for data communications. And, unlike PKZip, programs created with *Data Compression Library* can compress to memory as well as to disk, providing a whole new world of data compression possibilities.

Using the library is as simple as linking the compression and decompression routines—contained in an OBJ or LIB file—into your program. (If your favorite language can't use OBJs—*Visual Basic*, for instance—there are other ways to get to these routines.) PKware says the routines will run under OS/2 and *Windows* (they can even be linked into DLLs) as long as their data segments are marked nonsharable. The compression routine requires about 35K of buffer space, while decompression requires about 12K. The code itself takes between 5K and 6K.

Data Compression Library uses several variations on PKware's excellent Imploding/Exploding algorithm. It keeps track of the last 1K, 2K, or 4K of data; if there are any repetitions, the algorithm replaces the repeated string with a code. Unfortunately, PKZip's Shrinking/Unshrinking technique, a variation on the famous Ziv-Lempel-Welch algorithm, isn't offered here. Unisys has a patent on Ziv-Lempel-Welch compression—which builds a table of strings and checks to see if they repeat—so PKware kept it out of the library to avoid possible legal problems. With the current furor about software patents, I can hardly blame them.

Also included with the library is a routine that calculates 32-bit CRCs (cyclic redundancy codes). Besides making it possible to check the integrity of compressed files, this routine can be used for purposes unrelated to compression, such as error checking in communications programs.

Files compressed with *Data Compression Library*'s highest compression level often come out smaller than those compressed with PKZip. In part, it's because they don't need the header or directory information that's a part of every ZIP file. The library also has a special provision for compressing ASCII text that can save lots of space. The library is very fast at its lowest level of compression, but at the highest level it's 30 percent to 50 percent slower than PKZip. This, says PKware, is a tradeoff that reduces the library's memory demands; it's also partially due to the use of long pointers.

PKware's *Data Compression Library* isn't perfect. I wish it were as fast as PKZip at similar compression levels, and its lack of certain algorithms attests to the chilling effects of software patents. However, it's a one-of-a-kind, eminently useful package to have in your programming toolbox; it should be a great help when you need to get all that data into an itty-bitty file.

Have a favorite programming tool you'd like to see discussed here? Send suggestions to my Internet E-mail address, rogue@well.sf.ca.us, reachable via CompuServe, MCI Mail, Internet, and Usenet.

WHERE TO BUY

PKware Data Compression Library
PKware, Inc.
9025 N. Deerwood Dr.
Brown Deer, WI 53223
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POWER TIP NO. 218

Adjust 1-2-3 Ranges Precisely

When you're entering range-oriented functions such as @SUM() or executing commands such as */Range Format*, you may sometimes highlight the wrong range. Here's a handy trick that enables you to change the shape of the range without pressing <Esc> and starting over. Press the period key one or more times to move the cursor to the corner you want to adjust, then use the cursor keys to adjust the range. This gives you fine control over the range, allowing you to increase or decrease it in any direction. (Note: If your range consists of only one column or one row, you'll have to press the period key twice to move the cursor around.)

Richard Scoville
Contributing Editor

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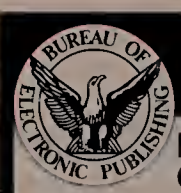

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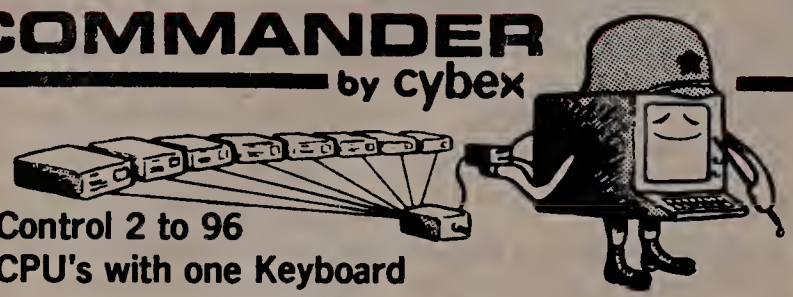

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No 8
On Page 211.

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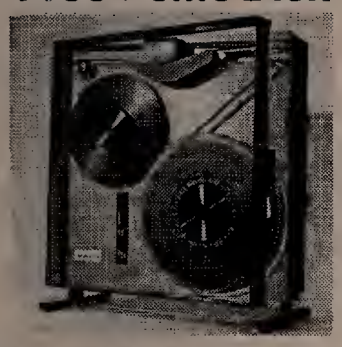

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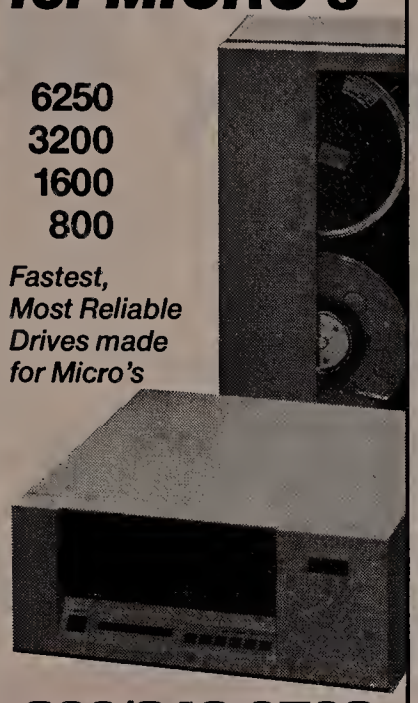

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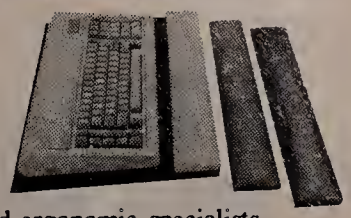

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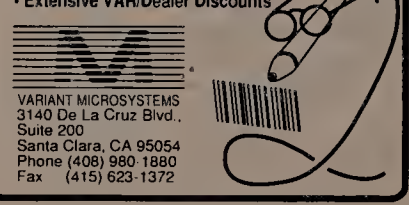

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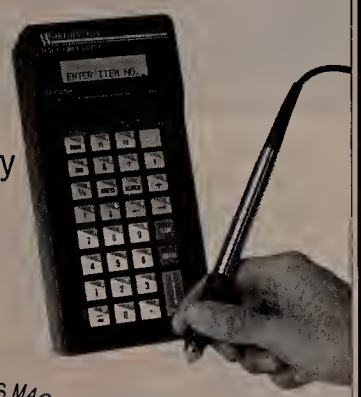

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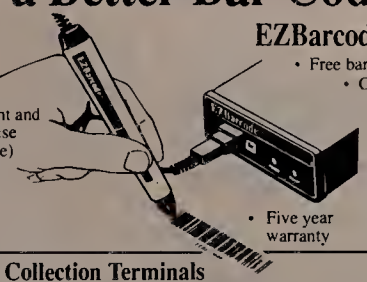

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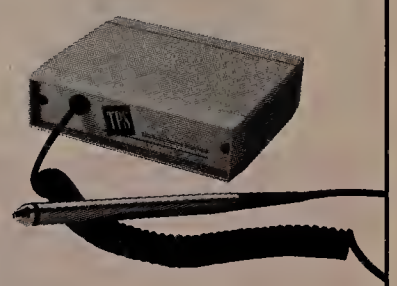

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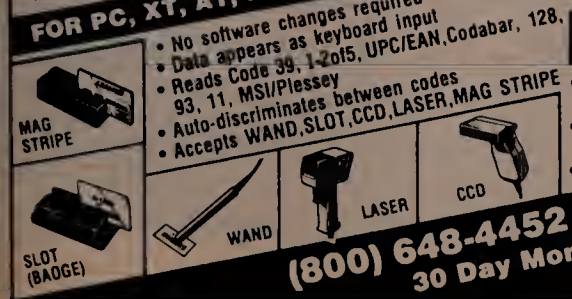

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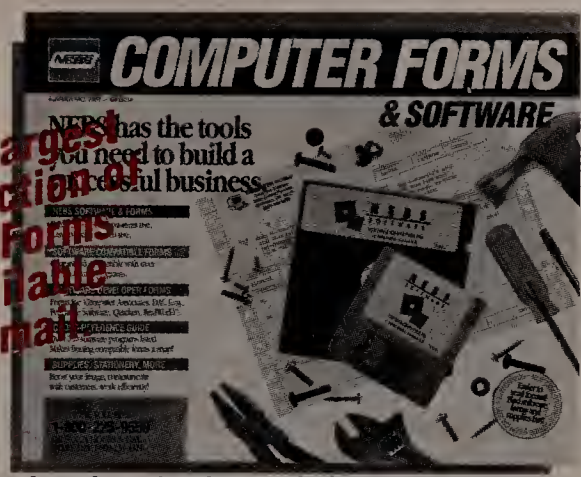

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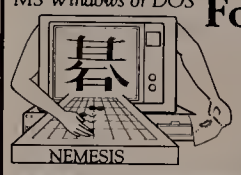

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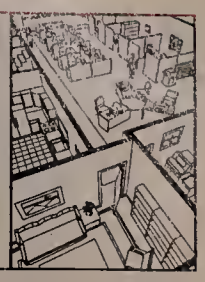

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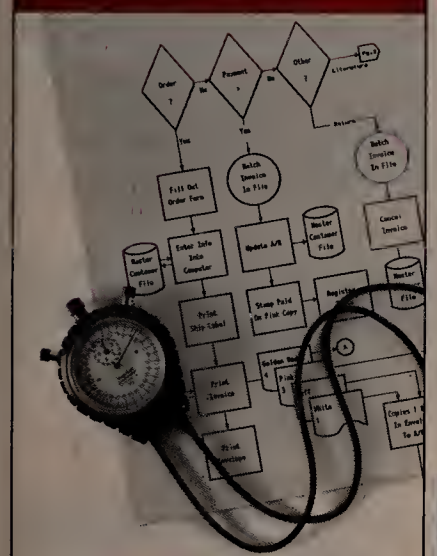

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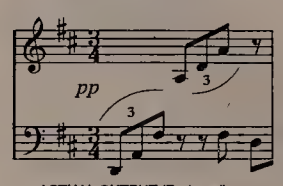

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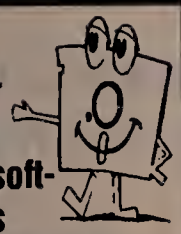

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VGA 1024ni	$1,929	$1,999	$2,249	$3,599

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The optimum combination of features, expandability, and power make the FastData 386/25 an ideal choice for those whose applications demand high speed 32 bit processing and expandability. The value of the 386/25 goes far beyond its price; it comes configured with a full four megabytes of fast RAM, a quick 18 millisecond 80 megabyte hard disk, and maximum VGA displaying 1024 by 768 resolution powered by a high-output 16 bit 1mb VGA board. Also, the FastMicro team will configure your FastData 386 exactly the way you want, without sending you shopping elsewhere.

Standard Features

- ✓ 25mhz Intel 80386-DX.
- ✓ 4 megabytes of high speed RAM.
- ✓ 80 mb 18ms IDE hard disk, 1:1 interleave.
- ✓ 1.2mb 5.25"and 1.44mb 3.5" floppy drives.
- ✓ Standard chassis or mini-tower (shown) with keylock, speed and reset buttons.
- ✓ 80387-DX coprocessor socket.
- ✓ 200 watt power supply
- ✓ 14" Super VGA color monitor, 1024x768 resolution, with 16 bit VGA card with 512K.
- ✓ Clock calendar, parallel port, two serial ports, and game port.
- ✓ Keytronics 101 key keyboard.
- ✓ 8 slots & 5 drive bays.
- ✓ Full Shadow RAM and LIM 4.0 EMS support.
- ✓ MS-DOS 5.0.
- ✓ Windows & Mouse add $69.
- ✓ FCC Class B approved.

386/DX25	80mb	100mb	200mb	660mb
Mono	$1,399	$1,469	$1,719	$3,069
Mono VGA	$1,499	$1,569	$1,819	$3,169
VGA 1024i	$1,699	$1,769	$2,019	$3,369
VGA 1024ni	$1,799	$1,869	$2,119	$3,469

FastData 486/25

Call about our hot 486, now just $2,399 with 4mb RAM, Super VGA & 100mb drive. Includes a 128K two-stage cache and is expandable to 64mb of memory.

All FastData Systems Include:

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FastData SX Systems

$1499 FastData SX/20

25% faster than a 16mhz SX, the FastData SX/20 adds even greater performance to its 386 multitasking capabilities. Just $200 more than our SX/16, this machine also includes an 80mb hard drive in addition to the super VGA color monitor and 16 bit VGA adaptor, Keytronics keyboard, DOS 5.0, and two floppy drives. The system includes two megabytes of memory and is expandable to eight on the main system board. Remember, when you have questions, need to solve a problem, or want recommendations on products for your system, the FastMicro team is standing by toll-free to provide product support for as long as you own your FastData personal computer.

Standard Features

- ✓ 20mhz Intel™ 386-SX processor.
- ✓ 2 megabytes of high speed RAM.
- ✓ 80 mb 18ms IDE hard disk, 1:1 interleave.
- ✓ 1.2mb 5.25" and 1.44mb 3.5" floppy drives.
- ✓ Standard chassis (shown) or mini-tower with keylock, speed and reset buttons.
- ✓ 200 watt power supply
- ✓ 14" Super VGA color monitor with 16 bit VGA card with 512K.
- ✓ Clock calendar, parallel port, two serial ports, and game port.
- ✓ Keytronics 101 key keyboard.
- ✓ 8 expansion slots, 5 drive bays.
- ✓ 80387-SX coprocessor socket.
- ✓ Full Shadow RAM and LIM 4.0 EMS support.
- ✓ Windows & Mouse add $69.
- ✓ MS-DOS 5.0.
- ✓ FCC Class B approved.

386/SX20	40mb	80mb	100mb	200mb
Mono	$1,069	$1,199	$1,269	$1,519
Mono VGA	$1,169	$1,299	$1,369	$1,619
VGA Color	$1,319	$1,449	$1,519	$1,769
VGA 1024i	$1,369	$1,499	$1,569	$1,819

$1299 FastData 386/SX

Combine the benefits of an advanced Intel 386 processor, the value of a 286 and the advantages of FastData and you've got the FastData 386/SX! This machine is the choice of those who want to run today's powerful 386 and multitasking software, like Windows, and also want to run their favorite DOS applications at surprising speeds. We've made our customers' favorite options standard: it comes with an ample two megabytes of memory, a high performance 40mb hard drive, and 16 bit super VGA. Compare performance, features, and service and you will find no better SX value. Interested further? Try the FastData 386/SX for 30 days; you have to be happy - if not, we'll take it back.

Standard Features

- ✓ 16mhz Intel™ 386-SX processor.
- ✓ 2 megabytes of fast RAM.
- ✓ 40 mb 28ms IDE hard disk, 1:1 interleave.
- ✓ 1.2mb 5.25" and 1.44mb 3.5" floppy drives.
- ✓ Standard , mini tower, or mini desktop (shown) chassis with keylock, speed and reset buttons.
- ✓ 200 watt power supply
- ✓ 14" Super VGA color monitor with 16 bit VGA card with 512K.
- ✓ Clock calendar, parallel port, two serial ports, and a game port.
- ✓ Keytronics 101 key keyboard.
- ✓ 8 expansion slots, 5 drive bays.
- ✓ 80387-SX coprocessor socket.
- ✓ Full Shadow RAM and LIM 4.0 EMS support.
- ✓ Windows & Mouse add $69.
- ✓ MS-DOS 5.0.
- ✓ FCC Class B approved.

386/SX16	40mb	80mb	100mb	200mb
Mono	$999	$1,129	$1,199	$1,449
Mono VGA	$1,099	$1,229	$1,299	$1,549
VGA Color	$1,249	$1,379	$1,449	$1,699
VGA 1024i	$1,299	$1,429	$1,499	$1,749

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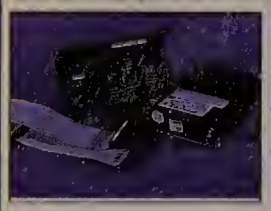
- DJ-20 80-240mb Int. Tape 299
- External Kit 69

Toshiba 100mb IDE Kit $369



Upgrade your 286 or 386 to IDE technology and Toshiba quality at a FastMicro price. This kit comes with a fast 20ms 105mb drive and built-in 1:1 controller, 16 bit IDE card with dual floppy controller & cables, 5.25" brackets & rails.

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- MC1518 1.3gb FH ESDI 14ms 2595

Plus Development
- HardCard IIXL 50mb 9 ms 16bit 399
- HardCard IIXL 105mb 9 ms 16bit 579

Seagate 89mb AT Kit $319

IDE performance, big 89 megabyte capacity, 19ms access time and 5 mbps transfer rate make this a great buy. Controller, cables and rails are included to make installation fast and easy.

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- 40MB AT ST157A 28ms IDE Drive 179
- 89MB ST1102A 19ms IDE Drive 299
- 125MB ST1144A 19ms IDE Drive 359
- 210MB ST1239A 15ms IDE Drive 599
- 330MB ST2383E 16ms ESDI Drive 1199

Teac
- 1.2MB 5.25" Floppy 65
- 1.44MB 3.5" Floppy 65

Toshiba 1.44mb Floppy $59

Complete with mounting brackets and installation instructions, this Toshiba works in all true 286 & 386 compatibles. Will also read/write/format 720K 3.5" disks. Rails, add $5.

Toshiba
- 360K 5.25" Floppy (Black) 59
- 1.2MB 5.25" Floppy 59
- 1.44MB 3.5" Floppy 59
- 100mb MK234FCH IDE 3.5" drive 349

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- WDAC280 80mb IDE 20ms 299
- WDAP4200 200mb IDE 20ms 649

MODEMS & FAX

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- 2400 ETC Internal / External 129/159
- 8514/Ultra+VGA 1mb 599
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Don't settle for curled-up thermal paper or tie up your PC to receive faxes - get OmniLink Laser. It connects to your phone line and HP compatible laser and receives and prints your faxes. You can still print anytime you want and OmniLink will store up to 30 faxes while your printing. Plus, its a 2400/9600 modem/send & receive fax (Reqires Software - $85).

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- 2400B Int with MNP 159
- PM9600SA Ext. V.32/V.42bis 449

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FastData 16 Bit VGA $69 256K vers. $89 512K vers.

The FastData 16 bit VGA card features 256K of video memory, does CGA, EGA, & VGA up to 1024x768 and comes with drivers for popular software including Windows 3.0. It's expandable to 512K and has a 30 day money-back guarantee.

- FastData 16bit 1mb VGA 99
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- FastData MGP Card 29

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Your best value, guaranteed! We have a full line manufactured for us by manufacturers like Hyundai and Matsushita (Panasonic). As with all FastData branded product, you get a full 30-day money back satisfaction guarantee. Shown is the VGA color.

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- 9600B Send/Receive Fax w/2400B 119
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- IDE HD/FD w/Par/2 Serial/Game 39
- Parallel/2 Serial/Game Card 29
- RLL 16bit 1:1 Hard/Floppy Disk Cont. 59
- XT 1.44 Dual Floppy Controller 35

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The FastData 2400 baud internal modem is fully Hayes compatible and can be configured to COM port 1-4. It has an internal speaker, is auto answer & auto dial, and comes with communications software.

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PostScript laser printing has never been so affordable. The TI PS17 includes 1.5mb of memory, PostScript by Adobe, and 17 standard fonts including Times, Helvetica, Courier and Symbol. It handles paper up to 8.5 x 14 and envelopes too!

Texas Instruments
- Microlaser PS17 1199
- Microlaser PS35 1499

FastData 286/12 $699

Imagine a fast 286 computer at a super price and you've got the FastData 286/12. This system is complete, not stripped. You get one megabyte of zero-wait-state memory and a 28ms IDE hard disk - standard. Also included is an amber monitor and graphics card, your choice of a high density 1.2mb or 1.44mb floppy drive and a KeyTronic keyboard. And since its a FastData, you are backed with toll-free technical support, one year warranty with the FastShip replacement program & on-site service plan, and our 30 day full money back satisfaction guarantee!

- ✓ 12mhz 80286 processor.
- ✓ 1 megabyte RAM.
- ✓ 40 mb 28ms IDE hard disk 1:1 interleave.
- ✓ 1.2mb 5.25" or 1.44mb 3.5" floppy drive (2nd drive add $59)
- ✓ Standard chassis (shown)
- ✓ Five drive bays.
- ✓ 200 watt power supply.
- ✓ Math coprocessor socket
- ✓ Monochrome monitor with monochrome graphic board.
- ✓ Clock calendar, parallel port, game port, & 2 serial ports.
- ✓ Keytronics enhanced 101 keyboard.
- ✓ 8 expansion slots, 6 available.
- ✓ MS-DOS 5.0.
- ✓ Full documentation.
- ✓ FCC Class B approved.

286/12	40mb	80mb	100mb	200mb
Mono	$699	$829	$899	$1,149
Mono VGA	$799	$929	$999	$1,249
VGA Color	$949	$1,079	$1,149	$1,399
VGA 1024i	$999	$1,129	$1,199	$1,449

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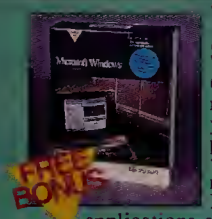

Get in on the Windows revolution! Windows turns your 286 or above into a powerful multitasking workstation that runs even non-Windows applications. Includes many integrated applications standard. Plus, if you buy Windows from FastMicro, we'll throw in 12 of the best Windows shareware programs free!

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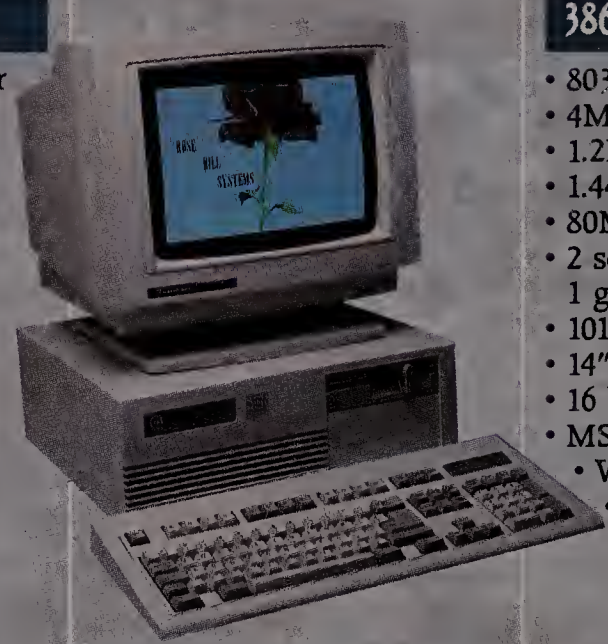

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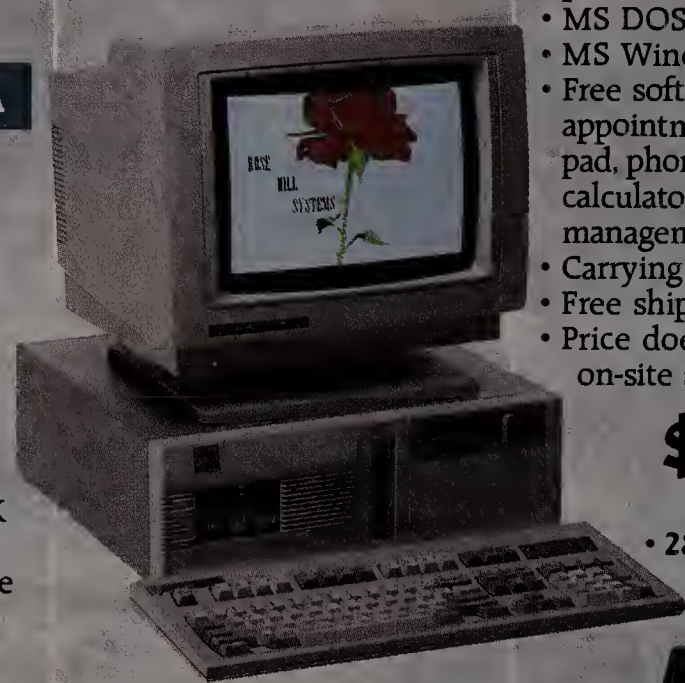

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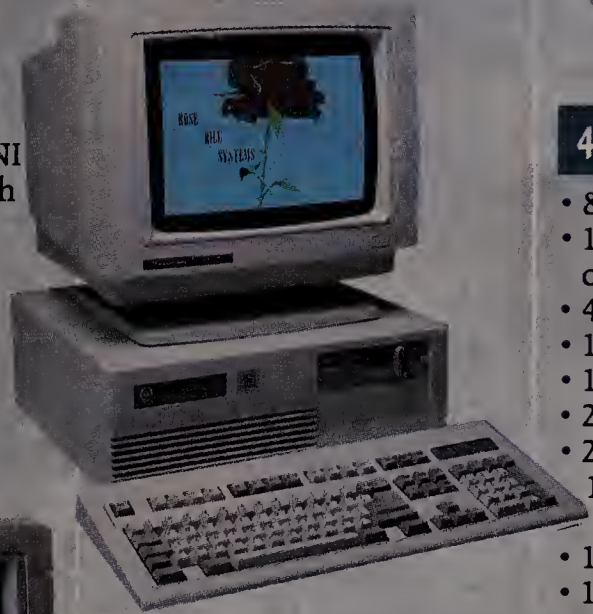

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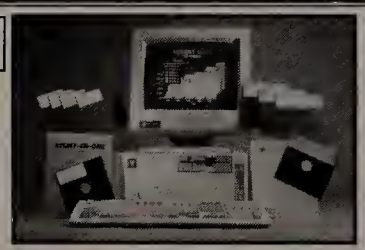

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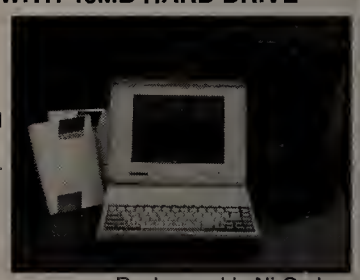

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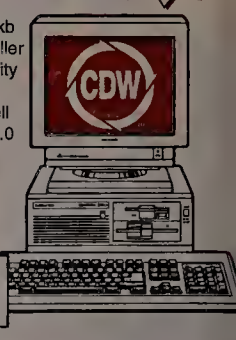

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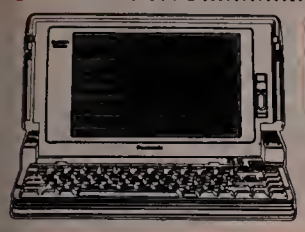

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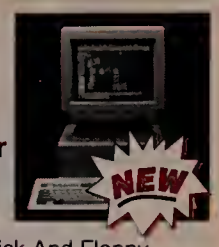

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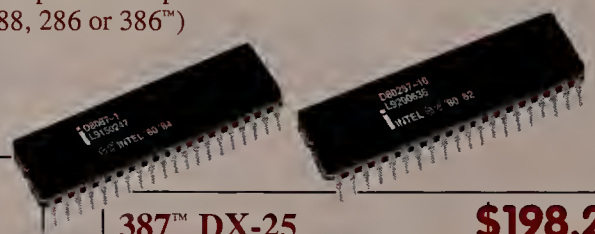

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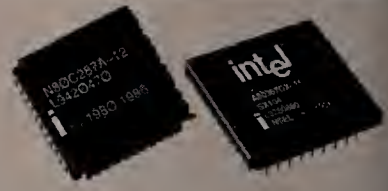

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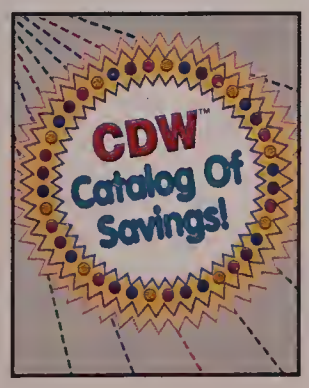

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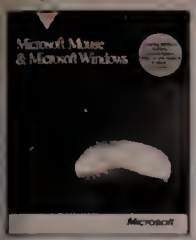

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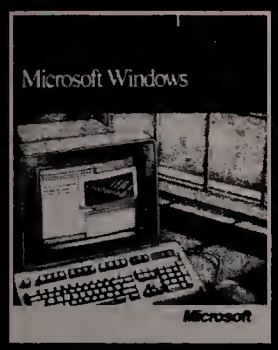

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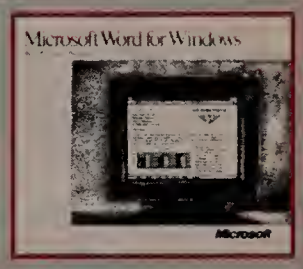

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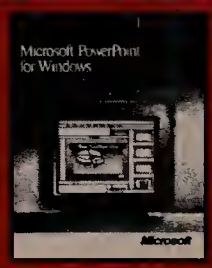

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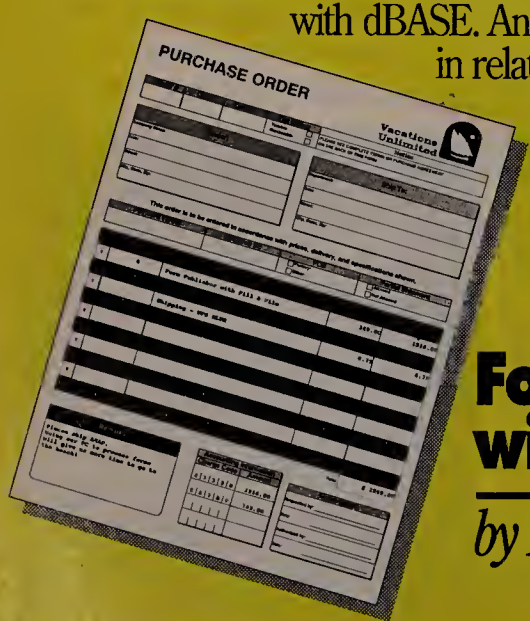

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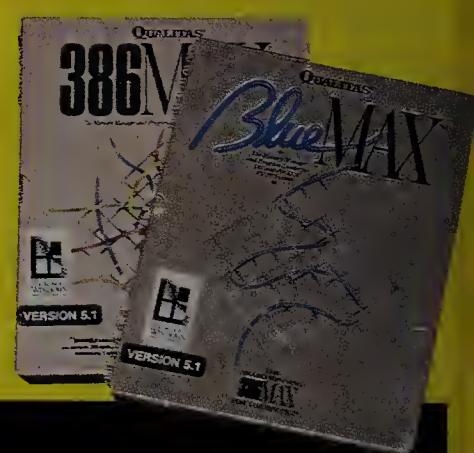

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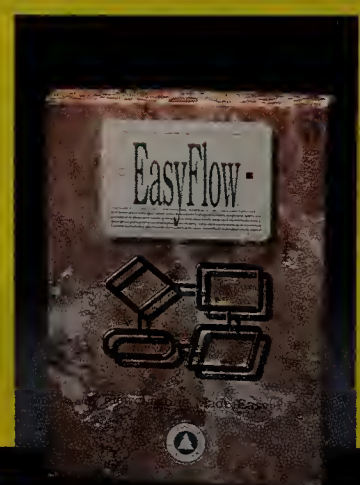

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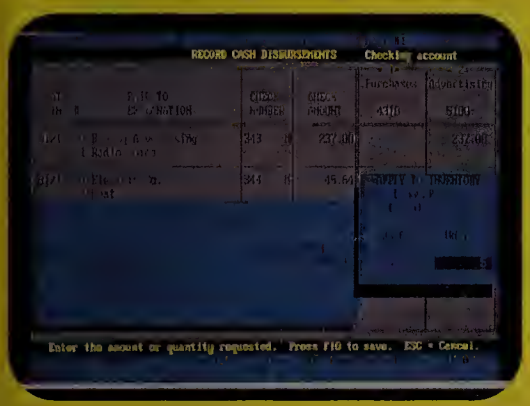

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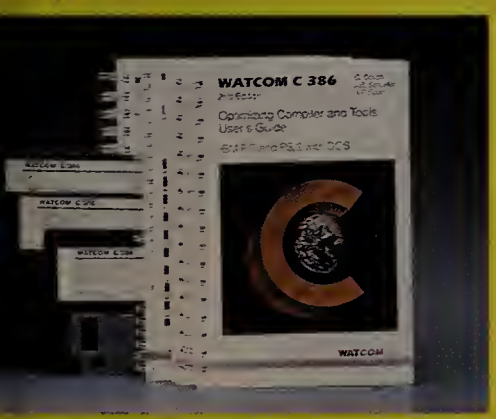

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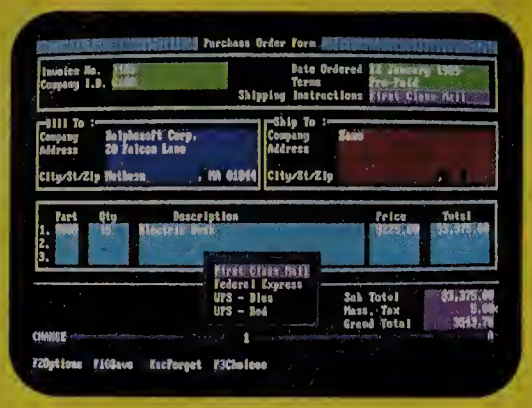

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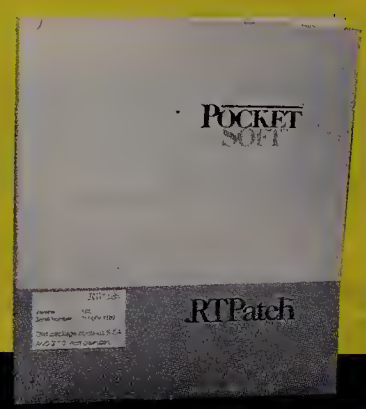

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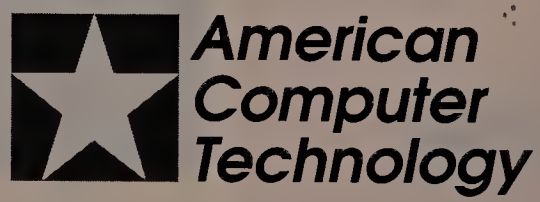

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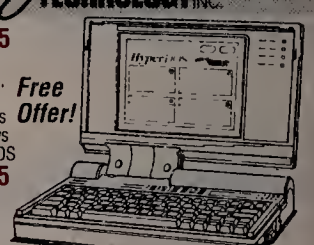

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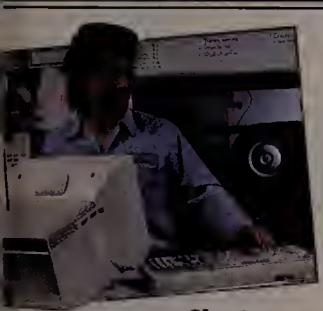

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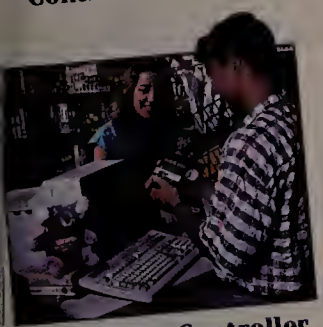

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THE HOME OFFICE

The practical guide to home/office computing

Thanks for the memory.

Steve Bass

Many 286, 386, and 486 PCs today have at least 1MB of memory, but the part beyond 640K rarely gets used. So it's no surprise that the question most commonly asked of the Pasadena IBM Users Group's expert panel is, "What can I do with the extra memory?"

The answer is plenty, and it's easier than ever because we now have an assortment of memory managers designed to make the most of your system's extra memory. If you have a 1MB machine, you've got 384K of *extended memory.* You can add more to empty motherboard sockets, on a card made for a high-speed memory slot (if your PC has one), or on a card you install in an expansion slot (which slows memory access). You can also add *expanded* memory via an expansion slot card (it also holds a memory management chip), but it's slower than extended memory and can be used only by certain programs.

The most pedestrian use of extra memory is a RAM disk: You simulate a physical disk in memory so you can create, read, and write files at the speed of RAM—much faster than reading from and writing to a hard disk. DOS has a RAM disk you can install by adding the line DEVICE=C:\DOS\VDISK.SYS (DOS 5.0 calls it RAMDRIVE.SYS) to your CONFIG.SYS file.

You can also use extra memory to make your computer work smarter by setting up a disk cache, a print spooler, or both. Disk caching stores the most often accessed data in memory so you can get it faster than from a hard disk. A spooler is a parking place for your print jobs so you can get back to your program right away, while the spooler sends your work to the printer.

I used to tinker endlessly with memory and still not load everything I wanted; today *386Max* does it for me. Memory managers like this determine

J. OTTO SIEBOLD

how best to use my system's extended and expanded memory. For example, they can load device drivers and TSRs into the area between 640K and 1MB, called upper memory, freeing up conventional memory for programs that can't use any other kind.

At home I used another memory manager, *QEMM*, to tuck 120K of device drivers and TSRs—mouse driver, screen dimmer, and so on—into memory above 640K on my monochrome 386. That gives me 25 percent more conventional memory—an amazing 620K—and better performance because both my programs and large data files can be loaded into conventional memory. By using extended memory as though it were expanded memory, *QEMM* also gives a boost to programs like *1-2-3* and *Ventura* that recognize only conventional and expanded memory.

If you've made the switch to DOS 5.0, you'll find either *QEMM* or *386Max* essential (*QRAM* and *Move'Em* are their 286 counterparts). While the new DOS loads most of COMMAND.COM into high memory, it lacks the sleight of hand of these third-party memory managers when it comes to sizing up and loading TSRs and device drivers into just the right places. If you'd like to try before you buy, the shareware *Last Byte Memory Manager* offers everything the commercial managers do.

Since memory managers fool around with your CONFIG.SYS file, copy it to a bootable floppy before you start. Getting the most from your memory doesn't take an expert panel—just a brilliant memory manager.

Contributing Editor Steve Bass is a family therapist and president of Pasadena IBM Users Group.

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2. Are you interested in computer products for:
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4. How many PCs does your company plan to purchase in the next twelve months?

Quantity	Timeframe	Quantity	Timeframe
_____	Less than 1 month	_____	6-12 months
_____	1-3 months	_____	More than 12 months
_____	3-6 months		

5. What do you plan to use computer products for?

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6. How many PCs do you have installed now at your company?

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